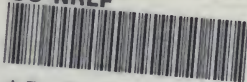


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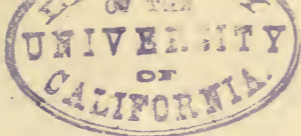
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## PREFACE.

---

IN preparing this "Arithmetic for Beginners" an endeavour has been made to keep in view two or three simple principles which are suggested by familiar experience in teaching, but which are often overlooked:—

(1) That young children learn the processes and meaning of arithmetic more readily by the help of short, easy problems, than by dealing at first with numbers too large for their imagination to grasp.

(2) That the difficulties of this study should be presented to the understanding of a learner one at a time.

(3) That as soon as each principle or rule has been learned and illustrated, exercises are needed, calling on the scholar to put the rule or principle into practice.

Accordingly, it will be found that the sums and examples in this little book are very simple, dealing for the most part with the familiar computations in use in ordinary life. They are so grouped and graduated that each step is seen to be a very natural sequel to the former. The tables of notation, addition, and multiplication are so divided, that as soon as each small portion of them is learned, a few exercises are given in the use of that portion before the next portion is attempted.

The range of the book includes all the most important applications of the simple and compound rules, and a brief introduction to Fractions, but does not extend to Proportion and Decimals.

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# ARITHMETIC FOR BEGINNERS.

---

## SIMPLE NUMBERS AND THEIR NAMES.

NAME OF THE OBJECTS.	NUMBER OF THE SPOTS SHOWN.	
	SPOTS.	IN WORDS.      IN FIGURES.
●	One	1
● ●	Two	2
● ● ●	Three	3
● ● ● ●	Four	4
● ● ● ● ●	Five	5
● ● ● ● ● ●	Six	6
● ● ● ● ● ● ●	Seven	7
● ● ● ● ● ● ● ●	Eight	8
● ● ● ● ● ● ● ● ●	Nine	9

### EXERCISE I.

 (1) Say what is the name of each figure :—

4, 7, 3, 2, 6, 5, 7, 1, 9, 8.

(2) Write the figure for each number :—

Nine, three, four, seven, five, six, three, eight, two.

## COUNTING.

[Nine counters, marbles or pebbles, should be used, and the learner may be allowed to use the fingers for finding each result.]

1. Count how many fingers you have on your hand.
2. Take two away, and how many remain?
3. How many letters are there in the word "Number"?
4. If I have five shillings in my purse, and put three more in, how many have I?
5. There are eight children in a class, and four go away; how many are left?
6. Begin with the number nine, and say the numbers backwards, taking away one each time.

(7) Place under each of the following pairs of figures the sum to which they amount:—

4	6	5	2	5	7	4	6
3	2	1	7	3	1	2	3
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—

(8) Place under each of the following pairs of figures the difference between them:—

8	7	6	4	5	9	8	7
2	4	3	3	3	4	5	3
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—


## NUMBERS COMPOSED OF TENS.

1. When a figure stands in the second place to the left, it means ten times more than if it stands in the first. Thus,—

11	Ten and one	eleven
12	Ten and two	twelve
13	Ten and three	thirteen
16	Ten and six	sixteen
19	Ten and nine	nineteen
24	Two tens and four	twenty-four

57	Five tens and seven	fifty-seven
63	Six tens and three	sixty-three
88	Eight tens and eight	eighty-eight
14	Ten and four	fourteen
47	Four tens and seven	forty-seven
93	Nine tens and three	ninety-three
65	Six tens and five	sixty-five
72	Seven tens and two	seventy-two
99	Nine tens and nine	ninety-nine

## EXERCISE II.

 (1) Give the figures for these numbers :—

Thirty-four, seventeen, sixty-five, forty-three.

Eighty-seven, twenty-five, seventy-six, fifty-two.

Ninety-six, eighty-four, twenty-six, thirty-nine.

(2) Give the numbers for these figures :—

12, 34, 29, 64, 83.

25, 52, 95, 72, 81.

13, 62, 94, 31, 24.

2. A cipher or 0 is used to show that there is no number to fill a vacant place. Thus,—

10 means ten.


20 „ two tens, or twenty.

30 „ three tens, or thirty.

50 „ five tens, or fifty.

70 „ seven tens, or seventy.

## EXERCISE III.

 (1) Put into figures these numbers :—

Seventy, ninety, twenty, eighty, forty, ten.

(2) Put into words the figures—

20, 50, 80, 30, 70, 90, 10.

(3) Write out in order the whole of the figures from one to ninety-nine.

## COUNTING.

[A box of marbles or pebbles, a bag of nuts or some counters, should be used; the abacus or ball-frame will also be useful. At first no greater number than twelve should be placed before the learner.]

*The following should be learned by heart.*

Two and one are three	3	Three and one are four	4
„ two „ four	4	„ two „ five	5
„ three „ five	5	„ three „ six	6
„ four „ six	6	„ four „ seven	7
„ five „ seven	7	„ five „ eight	8
„ six „ eight	8	„ six „ nine	9
„ seven „ nine	9	„ seven „ ten	10
„ eight „ ten	10	„ eight „ eleven	11
„ nine „ eleven	11	„ nine „ twelve	12
„ ten „ twelve	12	„ ten „ thirteen	13
„ eleven „ thirteen	13	„ eleven „ fourteen	14
„ twelve „ fourteen	14	„ twelve „ fifteen	15

## EXERCISE IV.

1. Count the fingers of both hands; the panes of glass in the window; the books on the table; the scholars in the class.

2. If I have three nuts in one pocket, and four in the other, how many have I?

3. Place two pebbles in one hand and five in the other, and say how many they make.

4. Add five farthings to three.

5. How many legs are there on two chairs?

6. Count out as many pebbles as you have fingers on your hand.

7. Arrange on the floor as many stones as there are panes in the window, or children in the class.

8. Make four marks on a slate; add three more; count them all together.

9. If there are ten scholars in the class, and four go away, how many are left?

10. Out of six pence I spend four pence; how many pence are left?

11. How many more are eight nuts than three?

12. One child has ten apples, and the other seven; how many more has the first?

13. Make twelve strokes on the slate; rub out three, and see how many remain.

14. Place eleven marbles on the floor; take two away, and say how many remain.

15. Begin with the number twelve, and repeat backwards to one.

16. Say how many letters are in each word of the first line on this page.

17. What is the difference between the number of letters in "Caroline" and in "Jane"?

### EXERCISE V.

1. Two and four, seven and three, eight and two, nine and one, four and three, two and six, eight and three, three and five.

2. Take two from eight, from seven, from nine, from six, from five.

3. Take three from twelve, from seven, from eleven, from ten, from nine, from eight.

4. Add 6 to 3, 2 to 7, 5 to 3, 3 to 7, 8 to 2.

5. Add 7 to 2, 3 to 8, 6 to 3, 9 to 2.

6. What is the difference between 10 and 12, between 11 and 1, between 4 and 6, between 9 and 3?

7. Take 2 from 11, from 9, from 7, from 6, from 3.

8. Take 3 from 12, from 4, from 9, from 5, from 8.

9. Take 7 from 9, from 10, from 8, from 12.

10. Take 5 from 10, from 12, from 9, from 7.

11. How many more are 12 than 8, than 6, than eleven, than four?

12. How many should be added to twelve to make fifteen?

## EXERCISE VI.

(1) Place underneath each of the following pairs of figures the sum to which they amount:—

7	5	4	7	5	6	9	8	9
2	3	2	3	2	3	2	3	3
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—

(2) Place underneath each of the following pairs of figures the difference between them:—

5	7	8	9	12	8	7	6	9	10	11
2	3	2	6	3	5	1	3	6	3	8
—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—

The following should be learned by heart:—

Four and four are eight	8	Five and five are ten	10
„ five „ nine	9	„ six „ eleven	11
„ six „ ten	10	„ seven „ twelve	12
„ seven „ eleven	11	„ eight „ thirteen	13
„ eight „ twelve	12	„ nine „ fourteen	14
„ nine „ thirteen	13	„ ten „ fifteen	15
„ ten „ fourteen	14	„ eleven „ sixteen	16
„ eleven „ fifteen	15	„ twelve „ seventeen	17
„ twelve „ sixteen	16		

Six and six are twelve	12	Seven and seven are—	
„ seven „ thirteen	13	fourteen	14
„ eight „ fourteen	14	„ eight are fifteen	15
„ nine „ fifteen	15	„ nine „ sixteen	16
„ ten „ sixteen	16	„ ten „ seventeen	17
„ eleven „ seventeen	17	„ eleven „ eighteen	18
„ twelve „ eighteen	18	„ twelve „ nineteen	19

Eight and eight are sixteen	16	Nine and nine are—	
„ nine are seventeen	17	eighteen	18
„ ten „ eighteen	18	„ ten are nineteen	19
„ eleven „ nineteen	19	„ eleven „ twenty	20
„ twelve „ twenty	20	„ twelve „ twenty-one	21







4. Sometimes one figure of the number to be taken away is greater than the figure above it. Thus,—

73      Twenty-eight can be taken from seventy-three,  
28      but eight cannot be taken from three.

—      In such cases we *add ten* to both lines.

Add ten to the three

Eight from thirteen leaves five

Add ten to the two tens

Three tens from seven tens leaves  
four tens.


$$\begin{array}{r} 73 \\ 28 \\ \hline 45 \end{array} \left. \vphantom{\begin{array}{r} 73 \\ 28 \\ \hline 45 \end{array}} \right\} \begin{array}{r} 7 \mid 13 \\ 3 \mid 8 \\ \hline 4 \mid 5 \end{array}$$

Adding ten to both does not alter the difference.\*

So the difference between 73 and 28 is 45.

5. In subtracting it is better to set down the greater number above the less.

### EXERCISE X.

 Place underneath each pair of numbers the difference between them :—

17	20	35	71	93	85	50	33	12
9	16	16	24	26	17	16	28	7
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—

1. Take sixteen from twenty, twenty-nine from sixty-five, forty-three from eighty-one.

2. Ninety hurdles are wanted to make a fence, and the owner has only forty-seven; how many more must he buy?

3. How much are twenty-four pence more than nine pence?

4. If I have fifty books, and give away eighteen, how many remain?

5. How many shillings are in two purses, of which the one contains twenty-nine, and the other forty-seven?

6. How many must be added to seventeen marbles to make forty?

7. Take from eighty, the two numbers, forty-two and seventeen, and say what remains.

\* See "School Arithmetic," p. 12, and "Science of Arithmetic," Axiom VI.


8. Count the letters in each of the two lines of this question, and find the difference.

9. If a man owes me £75, and pays me only £48, how much is he still in my debt?

10. Of thirty-five children in a school eighteen go home; how many remain?

11. Take thirty-six pence from seventy.

### EXERCISE XI.

 Work the following addition sums:—

(1.)	8		(2.)	9	
	10			2	36
	7	29		35	53
	26	12	6	8	17
	19	20	12	10	6
	4	18	20	17	20
	20	7	15	6	3
	—	—	—	—	—
	—	—	—	—	—

3. Add together 14, 7, 30, and 6.

4. Find the sum of 28, 16, and 54.

5. How much do twenty-seven, twenty-eight, and twenty-nine make?

6. A man has to pay four bills, of £26, £9, £37, and £20 each; to what sum do they amount?

7. There are four paths in a garden, measuring 29 yards, 31 yards, 27 yards, and 18 yards respectively; what is their total length?

8. Add together 46 and 36, and take 26 from the amount.

9. Out of £50, I first pay a bill of £17 and then another of £22; how much have I left?

10. Add together 10, 11, 12, and 13, and take the amount from seventy-five.


11. Take forty-six from the sum of 22, 23, and 24.

12. How many times can eight be taken from 90?

**6.** When a figure stands in the third place from the right it means hundreds.

Thus, 731 seven HUNDRED and thirty-one.  
 800 eight HUNDRED.  
 210 two HUNDRED and ten.  
 305 three HUNDRED and five.

## EXERCISE XII.

 (1) Read in words the following figures :—

902, 516, 201, 824, 753, 961.  
 587, 911, 340, 921, 812.

EXPLANATION.—The first number is made up of nine hundred, no tens and two, and is read *nine hundred and two*. The second is made up of five hundred, one ten and six, and is read five hundred and sixteen.

(2) Give the figures for the following numbers :—

Seven hundred and eleven. Three hundred and six.  
 Four hundred and fourteen. Five hundred and nine.  
 Eight hundred and twelve. Three hundred and seventy-four.  
 Six hundred and nineteen. Nine hundred and twelve.  
 Five hundred and ten. Four hundred and fifty.

*Example of Addition of Hundreds.*

3	6	5	=	Three hundred and sixty-five.
	1	8	=	Eighteen.
5	0	4	=	Five hundred and four.
	3	9	=	Thirty-nine.
	1	2	=	Twelve.

9 | 3 | 8 = Nine hundred and thirty-eight.

Two and nine, and four, and eight, and five, make twenty-eight. Set down eight and carry two tens.

Two tens, and one, and three, and one, and six, make thirteen tens, or one hundred, and three tens. Set down three tens and carry one hundred.

One hundred, and five, and three, make nine hundred. Set down nine hundred.

The whole sum is nine hundred and thirty-eight.

**7. CAUTION.**—Always put figures of the same meaning in the same column,—tens under tens, hundreds under hundreds, &c.

## EXERCISE XIII.

 Work the following additions :—

			(2.) 268	321	185
(1.) 231	212	610	15	250	27
28	83	19	305	18	3
540	124	124	219	302	19
79	71	63	6	65	204
6	60	115	54	4	12

3. There are in a library forty-two books in one row, twenty-eight in another, eighty in another, and sixteen in the last; how many are there in all?

4. A man owes £719 to Jones, £28 to Smith, £100 to Brown, and £17 to Johnson; what does he owe altogether?

5. Count the panes in four windows, having twenty-four panes in each.

6. On a farm are 14 oxen, 208 sheep, 17 horses, and 31 pigs; how many animals in all?

7. In the five classes of a school there are nineteen, twenty-seven, thirty, fifteen, and twenty four; how many are there in all?

8. Add together a dozen, a score, six, and eleven.

9. In four bags of marbles there are 27, 16, 39, and 20 respectively; how many marbles are there in all?

10. If I change half a sovereign into twenty sixpences, half a crown into five, and a florin into four, and if I have seventeen sixpences besides, how many sixpences have I in all?

11. There were three candidates at an election, of whom the first had 159 votes, the second 216, and the third four hundred; how many people voted?

8. In subtracting, add ten to the upper line whenever the figure beneath cannot be taken from it. But whenever ten is added to the upper line it must also be added as one, to the figure next to the left on the lower line.

*Example of working Subtraction with Hundreds.*

What is the difference between 385 and 731?

Set down the greater number above the other.

$$\begin{array}{r} 731 \\ 385 \\ \hline 346 \end{array} \left. \vphantom{\begin{array}{r} 731 \\ 385 \\ \hline 346 \end{array}} \right\} = \begin{array}{r} 7 \mid 13 \mid 11 \\ 4 \mid 9 \mid 5 \\ \hline 3 \mid 4 \mid 6 \end{array} \begin{array}{l} \text{Since 5 cannot be taken} \\ \text{from 1, add ten to the one (4).} \\ \text{Five from eleven leaves six.} \\ \text{Set down six.} \end{array}$$

Add one ten to eight tens in the lower line.

9 tens cannot be taken from 3 tens, so add ten tens to the upper line.

Nine from thirteen leaves four. Set down 4 tens.

Add ten tens, which are one hundred, to the 3 hundred.

Four hundreds from seven hundreds leaves three hundreds. Set down 3 hundreds.

The difference is three hundred and forty-six.

EXERCISE XIV.

1. Add together three hundred and four, five hundred and seventeen, and one hundred and thirty-eight.

2. Take sixty-five from one hundred; and three hundred and fourteen from six hundred.

3. How many more books has one gentleman who has 856 in his library than another who has 695?

4. What sum given to a person who has 28 pounds would make up his money to 50 pounds?

5. How many must be put in a bag containing 163 nuts to make up the number to 350?

6. Out of a set of 150 prints, 26 are lost: how many remain?

7. Of two windows, containing twenty-four panes each, seventeen panes are broken: how many remain whole?

8. A person has saved £187 : how much more must he save to make up £500?


9. What is the difference between the incomes of two persons, of whom one has £675, and the other £850 a year?

10. At an election one candidate has 847 votes, and the other 691 : what is the majority?

11. A man owes two sums of money, £65 and £24; he has only £50 to pay : how much does he still owe?

12. Out of a debt of £100 a man pays first £25 and afterwards £36 : how much remains unpaid?

13. Add together three hundred and fourteen and two hundred and seventy six, and take four hundred and sixteen from the result.

 Work the following subtractions:—

(14.)	729	512	840	(15.)	368	500
	434	326	127		29	124

(16.)	287	206	597	(17.)	500	240	629
	153	9	329		18	73	142

18. Take 187 and 456 from 900.

19. From 314 and 625 take 274.

20. A man drives 32 miles on Monday, 25 on Tuesday, 24 on Wednesday, rests on Thursday, drives again 20 miles on Friday, and 18 on Saturday : how far has he travelled in the week?

21. In two villages, containing 136 and 348 people respectively : what is the total population?

22. At the census of 1861 a parish had 343 inhabitants, and in 1871 there were 512 ; what was the increase?

23. Take the sum of 243 and 356 from nine hundred and fifty.

9. When a figure stands in the fourth place from the right it means thousands. Thus,—

- 1340 One THOUSAND three hundred and forty.  
 7298 Seven THOUSAND two hundred and ninety-eight.  
 2000 Two THOUSAND.  
 3040 Three THOUSAND and forty.  
 5012 Five THOUSAND and twelve.

## EXERCISE XV.

 (1) *Read in words these figures :—*

7342, 1085, 7112, 9026, 3720, 5102.  
 8721, 1963, 2018, 1702, 3960, 8541.  
 2165, 3094, 2708, 6130, 5291, 5012.

(2) *Express in figures these numbers :—*

Three thousand nine hundred and twelve. Two thousand and seventeen. Five thousand and nine. Six thousand eight hundred and twelve. Four thousand and fourteen. Five thousand six hundred and four. Nine thousand eight hundred and eighty-eight. Four thousand and fifty. Six hundred and forty-one. One thousand two hundred and eleven.

## EXERCISE XVI.

1. How many miles would a man travel in a week who went 58 miles on Monday, 126 on Tuesday, 70 on Wednesday, 119 on Thursday, 310 on Friday, and 67 on Saturday?

2. If there are five hundred and forty-six people living in one street, two thousand seven hundred and four in another, and three hundred and eleven in the next, how many are there in all?

3. An irregularly shaped field has four sides, of which the first is 1204 feet long, the second 395, the third 2038, and the fourth 685; how many feet are there in the fence surrounding the field?

4. If a man has five debtors who owe him £57, £1038, £19, £212, and £66 respectively, how much is owing to him? and if he owes £295, what is he worth?


5. How much longer is a road a thousand miles long than one measuring 674 miles?

6. To what sum must I add £453 to make up £840?

7. Three boys have respectively 79 nuts, 83 nuts, and 220 nuts; how many has the last more than the two others put together?

8. If at an election 794 voted for A, 1628 for B, and 1577 for C, what was the majority of B over C, of B over A, and of C over A?

9. Take 372 twice from a thousand, and say what remains.

 In the following sums, place words by the side of each line, thus:—

1712 One thousand seven hundred and twelve.

29 Twenty-nine.

4804 Four thousand eight hundred and four.

712 Seven hundred and twelve.

16 Sixteen.

7273 Seven thousand two hundred and seventy-three.

*Addition.*

(10.)	3162	2984	1061	(11.)	127	219
	845	127	2138		3069	62
	17	3206	547		218	1357
	209	518	1019		57	287
	1630	79	67		135	4096
	7	3120	125		2634	23
	—	—	—		—	—
	—	—	—		—	—

*Subtraction.*

(12.)	1270	2160	7140	(13.)	5130	2070
	184	1329	2765		2271	614
	—	—	—		—	—
	—	—	—		—	—



## THE MULTIPLICATION TABLE AND ITS USES.

**10.** *The following should be learned by heart :—*

Two twos are four . . 4	Three threes are nine . . 9
„ threes „ six . . 6	„ fours are twelve . . 12
„ fours „ eight . . 8	„ fives „ fifteen . . 15
„ fives „ ten . . 10	„ sixes „ eighteen . 18
„ sixes „ twelve . 12	„ sevens „ twenty-one 21
„ sevens „ fourteen . 14	„ eights „ twenty-four 24
„ eights „ sixteen . 16	„ nines „ twenty-
„ nines „ eighteen . 18	seven 27
„ tens „ twenty . 20	„ tens „ thirty . . 30
„ elevens „ twenty-two 22	„ elevens „ thirty-three 33
„ twelves „ twenty-four 24	„ twelves „ thirty-six . 36

These numbers are found by adding two and three at each step.

## EXERCISE XVII.

1. How many legs have three chairs?
2. How many fingers are there on three hands?
3. If there are eight panes of glass in each window, how many in two windows? In three?
4. In three purses containing eight shillings each, how many shillings are there?
5. What is the half of 12? of 16? of 18? of 20?
6. What is the third part of 12? of 15? of 9? of 6?
7. Divide twelve pence among two persons. Among three.
8. Give fifteen nuts among three persons; how many has each?
9. What is the third part of twenty-one?
10. How many threes are there in twelve? how many twos?
11. What number multiplied by five gives fifteen?
12. How many rows of twelve each could be made of twenty-four soldiers? of eight each?

**11.** When sums are worked in multiplication, a part of each answer is set down, and the rest carried, as in addition. See **3**.

*Example I.*

Multiply 1762 by two.

$$\begin{array}{r|l}
 1 & 7 & 6 & 2 & 1762 \\
 & & & 2 & 2 \\
 \hline
 2 & 14 & 12 & 4 & 3524 \\
 \hline
 \end{array}$$

Twice 2 are 4. Set down 4.

Twice 6 tens are 12 tens. Set down 2 *tens* and remove 10 tens, that is 1 hundred, to the hundreds.

Twice 7 hundreds are 14 hundreds, and 1 hundred brought from the tens makes 15 hundreds. Set down 5 *hundreds* and remove 10 hundreds, that is, 1 thousand, to the thousands.

Twice 1 thousand is 2 thousand, and 1 brought from the hundreds makes 3 *thousand*.

The result is 3,524.

*Example II.*

$$\begin{array}{r|l}
 5 & 7 & 1 & 8 & 5718 \\
 & & & 3 & 3 \\
 \hline
 15 & 21 & 3 & 24 & 17154 \\
 \hline
 \end{array}$$

NOTE.—The same should be set down as on the right.


EXERCISE XVIII.

1. Find twice eighteen ; Three times twenty-five.
2. Multiply forty-six by two ; Thirty-eight by three.
3. In three fields containing 106 sheep each, how many sheep ?
4. On two pages containing 453 words each, how many words ?
5. How many letters are there in 245 words of three letters each ?

6. In 3 rows of 169 trees each, how many trees?

7. Find the difference between twice forty-six and three times fifty-seven.

8. In five columns of names, two contain thirty-eight each, and three contain thirty-seven each; how many are there in all?

 Work the following questions:—

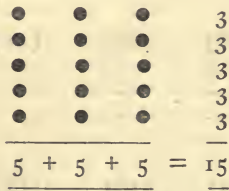
(9.) 17	529	123	1406	(10.) 718	627	526
2	3	2	3	2	2	3
-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----

MULTIPLICATION TABLE (continued).

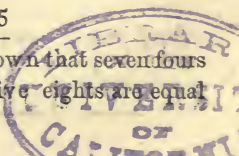
The following should be learned by heart:—

Four fours are sixteen . 16	Five fives are twenty-five 25
„ fives „ twenty . 20	„ sixes „ thirty . 30
„ sixes „ twenty-four 24	„ sevens „ thirty-five . 35
„ sevens „ twenty-eight 28	„ eights „ forty . 40
„ eights „ thirty-two . 32	„ nines „ forty-five . 45
„ nines „ thirty-six . 36	„ tens „ fifty . 50
„ tens „ forty . 40	„ elevens „ fifty-five . 55
„ elevens „ forty-four . 44	„ twelves „ sixty . 60
„ twelves „ forty-eight . 48	

**12.** It is not necessary that all these tables shall be of the same length, and shall begin with the number two. For five times three is the same as three times five, which has been already learned. The diagram will show this:—



In the same manner it might be shown that seven fours are the same as four sevens, or that five eights are equal to eight fives.



## EXERCISE XIX.

1. What are seven fours? five sixes? four sevens?
2. Three fives? eight fours? five twos? four threes?
3. How many fingers are there on four hands? on seven? on nine?
4. How many pence in nine fourpenny-pieces? in seven? in three? in six?
5. There are four farthings in a penny. Change into farthings—five pence, nine pence, fourpence.
6. Change into pence—three sixpences, four, five, two.
7. What is the eighth part of 32? the seventh of 28? the third of 21? the ninth of 18?
8. How many sixes are there in 30? how many fives in twenty?
9. Find how many marbles are possessed by four children who have eight each.
10. How many legs have twelve chairs?
11. If there are twelve pence in a shilling, how many are there in five shillings?
12. Multiply eleven by five, by three, by four.

(13.) 1712	5098	7121	(14.) 5060	1271
3	2	4	4	5

(15.) 8121	1563	7096	(16.) 6127	8193
4	2	5	4	3

(17.) 202	1027	3162	(18.) 1964	719
3	5	4	5	4

THE MULTIPLICATION TABLE (*continued*).

*The following should be learned by heart :—*

Six sixes are thirty-six . 36	Seven sevens are forty-
„ sevens „ forty-two . 42	nine 49
„ eights „ forty-eight . 48	„ eights are fifty-six . . 56
„ nines „ fifty-four . 54	„ nines „ sixty-three . 63
„ tens „ sixty . . 60	„ tens „ seventy . . 70
„ elevens „ sixty-six . 66	„ elevens „ seventy-seven 77
„ twelves „ seventy-two 72	„ twelves „ eighty-four . 84
Eight eights are sixty-four 64	Nine nines are eighty-one 81
„ nines „ seventy-two 72	„ tens „ ninety . . 90
„ tens „ eighty . . 80	„ elevens „ ninety-nine. 99
„ elevens „ eighty-eight 88	„ twelves „ one hundred
„ twelves „ ninety-six . 96	and eight 108

## EXERCISE XX.

1. What are seven eights? three sixes? four nines?
2. How many shillings must I give for five articles at seven shillings each? For seven at nine shillings each?
3. How many marbles are there in eight bags containing nine each? In seven containing five each?
4. What is the seventh part of forty-two? the ninth of seventy-two? The third of twenty-seven?
5. Find the fifth of thirty, the third, the sixth, the tenth.
6. Divide twenty-four cakes among four children, among six, among eight, among twelve, among two.
7. How many squares are on the carpet in four rows seven each? in five rows of eight each?
8. If seven boxes containing nine pence each were emptied, how many pence would there be in all?
9. In how many rows could you arrange forty-eight soldiers, and how many would there be in each?
10. Write out the whole of the tables, from twice two to nine times twelve, working them by addition.

*Example of Working Multiplication.*

**13.** In nine villages, each containing two thousand four hundred and seventeen persons, how many persons live?

2417 Two thousand four hundred and seventeen.  
 9

---

21,753 Twenty-one thousand seven hundred and fifty-three.

Nine times seven are 63. Set down 3 and carry the 6 tens.

Nine times 1 ten are 9 tens, and 6 tens make fifteen tens. Set down 5 tens and carry 1 hundred.

Nine times 4 hundreds are 36, and 1 make 37 hundreds. Set down 7 hundreds and carry the 3 thousands.

Nine times 2 thousand are 18, and 3 make 21 thousand. Set down 21.

The result is, Twenty-one thousand seven hundred and fifty-three.

## EXERCISE XXI.

1. Multiply four hundred and thirteen by five and by six.
2. In a regiment of 950 men, each has eleven rounds of cartridge; how many rounds are there in all?
3. There are twelve pence in a shilling; how many pence are there in 13 shillings? in 27 shillings? in 48 shillings? in 173 shillings?
4. There are 8 bushels in a quarter of corn; how many bushels are there in 17 quarters? in 39 quarters? in 217 quarters?
5. If a town contains 16,382 houses, and on an average 7 persons in each house, what is its population?
6. There are twelve inches in a foot; how many inches are there in 14 feet? In 59 feet? In 625 feet?



## MILLIONS.

**14.** Any number written with six figures to its right means millions.

A million is equal to one thousand thousands.

Thus 2,000,000 means two MILLIONS.

„ 1,563,000 „ one MILLION five hundred and sixty-three thousand.

„ 8,045,195 „ eight MILLIONS forty-five thousand one hundred and ninety-five.

„ 14,628,014 „ fourteen MILLIONS six hundred and twenty-eight thousand and fourteen.

**15. NOTE.**—It is always useful, in reading numbers consisting of many figures, to divide them into threes from the right. The group of figures with six to the right means millions; that with only three figures to the right means thousands. Thus, 27,416,845, is to be read twenty-seven *million*, four hundred and sixteen *thousand*, eight hundred and forty-five, and 217,013,302, is to be read 217 million, 13 thousand, 302.

## EXERCISE XXII.

(a) *Express in words these figures:—*

(1.) 171,028 6,510 17,216,370

(2.) 6,380,521 10,714,816 9,500,000

(3.) 318,721,625 219,346,285 10,716,800

(4.) 192,005 31,060 18,851,000

(5.) 7,120,008 3,197,620 85,070,110

(b) *Express in figures these numbers:—*

1. Two millions. Eight millions five hundred thousand.

2. Three hundred and forty-two thousand five hundred and nineteen.

3. Six millions ten thousand and nineteen. Fourteen millions and eleven.



4. Fourteen millions, three hundred and fifteen thousand, six hundred and nine.
5. Eleven millions and fifteen. Seven millions, three hundred and twelve thousand.
6. Forty-six millions, three hundred and nineteen thousand, six hundred and fifty-four.
7. Three hundred and twenty-two millions, seven hundred and twelve thousand, nine hundred and eleven.
8. Fifty-one millions, six thousand and three. Three millions and twelve.

**16.** We multiply a number by 10 when we place a cipher after it, or remove it one place to the left. We multiply by 100 when we place two ciphers; and by 1,000 when we place three ciphers, or remove it three places to the left. Thus:—

728, multiplied by 10 is	7,280 = seven thousand two hundred and eighty.
“ “ 100 „	72,800 = seventy-two thousand eight hundred.
“ “ 1,000 „	728,000 = seven hundred and twenty-eight thousand.
“ “ 10,000 „	7,280,000 = seven millions two hundred and eighty thousand.

### EXERCISE XXIII.

1. Multiply 17 by ten; 28 by ten; Three hundred and ten by ten.
2. Multiply 216 by 10; by a hundred, by a thousand.
3. How many men are there in 200 regiments containing 976 men each?
4. Take a hundred times 1384 from a thousand times the same number.
5. Add together a hundred times 117 and a thousand times 65.
6. Multiply 738 by 10; 21 by 100; and 317 by 1,000; and add the results together.
7. What are five hundred times sixty-five?

**17.** When a multiplier consists of two or more figures, the multiplication is to be worked in two or more lines, thus :—

*Example (a).* Multiply 3172 by 18; that is, by eight and by ten.

$$\begin{array}{r}
 3172 \\
 18 \\
 \hline
 25376 \quad \text{Eight times } 3172 \text{ (see } \mathbf{13}\text{).} \\
 31720 \quad \text{Ten times } 3172 \text{ (see } \mathbf{16}\text{).} \\
 \hline
 57,096 \quad \text{Eighteen times } 3172.
 \end{array}$$

**18.** NOTE.—The result of multiplying numbers is called their **PRODUCT**. Thus 63 is the *product* of 7 and 9; 100 is the *product* of 10 and 10; and 57,096 is the product of 3172 and 18.

*Example (b).* How many biscuits are there in 327 cases containing 4638 each?

$$\begin{array}{r}
 4638 \\
 327 \\
 \hline
 32466 \quad \text{Seven times } 4638 \text{ (see } \mathbf{13}\text{).} \\
 92760 \quad \text{Twenty (or ten times two) times } 4638 \text{ (see } \mathbf{16}\text{).} \\
 1391400 \quad \text{Three hundred (or } 100 \text{ times } 3\text{) times } 4638. \\
 \hline
 1,516,626 \quad \text{Three hundred and twenty-seven times } 4638.
 \end{array}$$

NOTE.—The cipher (0) at the end of the second line, and the two ciphers (00) at the end of the third line are not necessary in the working of the sum, and are usually omitted.

#### EXERCISE XXIV.

1. Find the number of houses in eighteen streets containing sixty-seven houses each.
2. Multiply four hundred and thirty-five by twenty-six.
3. How many nuts will be required for seventy-four children that they may have twenty-five apiece?

4. In forty-seven regiments, comprising one thousand three hundred and seventy-five men each, how many soldiers are there?

5. What number would be produced by multiplying 6283 by 147?

6. In twenty-eight chests of tea weighing 315 lbs. each, how many lbs. are there?

7. There are 112 lbs. in a cwt.; how many lbs. are there in 17 cwt.? How many in 315 cwt.?

8. There are 28 lbs. in a quarter; how many lbs. are there in 11 quarters? How many in 29 quarters?

9. Find the difference between twenty-seven times three hundred and sixteen, and thirty-nine times one hundred and twenty-eight.

10. There are 20 shillings in £1; how many shillings are there in £128? How many in £2163?

11. Add together the product of 763 and 29, and the product of 2138 and 17.

12. In a church there are 85 pews, of which 47 hold seven persons each, and the rest six each. How many persons can be seated in it?

13. There are 16 ounces in 1 lb.; how many ounces are there in 827 lbs.? How many in 1236 lbs.?

14.	21036 26 ----- -----	5172 19 ----- -----	15.	31062 29 ----- -----	17831 35 ----- -----
-----	-------------------------------	------------------------------	-----	-------------------------------	-------------------------------

16.	813 813 ----- -----	215 106 ----- -----	17.	37205 59 ----- -----	11825 37 ----- -----
-----	------------------------------	------------------------------	-----	-------------------------------	-------------------------------

18.	17386 37 ----- -----	5068 162 ----- -----	19.	41380 370 ----- -----	21639 306 ----- -----
-----	-------------------------------	-------------------------------	-----	--------------------------------	--------------------------------

**19.** When one number is the product of two others, we may multiply by it by multiplying by those two others in succession.

*Example (a).* Multiply 3172 by eighteen. Now eighteen equals twice nine. There are therefore two methods of doing this; first, that which is shown in **17**, and second, as follows:—

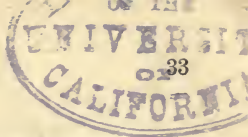
$$\begin{array}{r}
 3172 \\
 \underline{\quad 9} \\
 28548 \text{ nine times } 3172. \\
 \underline{\quad 2} \\
 57096 \text{ twice nine times } 3172, \\
 \text{or eighteen times } 3172.
 \end{array}$$

(b) Multiply 7298 by 42. Now 42 equals 6 times 7.

This sum may therefore be worked in either of these two ways:—

$$\begin{array}{r}
 1. \quad 7298 \\
 \underline{\quad 42} \\
 14596 \text{ twice } 7298. \\
 291,920 \text{ forty times } 7298. \\
 \underline{\quad \quad} \\
 306,516 \text{ forty-two times } 7298.
 \end{array}$$

$$\begin{array}{r}
 2. \quad 7298 \\
 \underline{\quad 7} \\
 51086 \text{ seven times } 7298. \\
 \underline{\quad 6} \\
 306,516 \text{ six times seven times } 7298, \text{ or forty-two} \\
 \text{times } 7298.
 \end{array}$$



## EXERCISE XXV.

Work each of the following sums in two ways as in the examples just given:—

1. Multiply 729 by 24. 8643 by 36.
2. Find the number of windows in 39 houses containing twenty-one windows each.
3. What is the product of 623 and 108? of 5163 and 96?
4. There are 24 grains in a pennyweight of gold; how many grains are there in 47 dwts.? in 318 dwts.?
5. There are 36 inches in a yard; how many inches are there in 17 yards? in 108 yards? in 94 yards?

$\begin{array}{r} 2372 \\ 35 \\ \hline \hline \end{array}$	$\begin{array}{r} 50861 \\ 27 \\ \hline \hline \end{array}$	$\begin{array}{r} 3198 \\ 120 \\ \hline \hline \end{array}$	$\begin{array}{r} 21945 \\ 72 \\ \hline \hline \end{array}$
--	---	---	---

$\begin{array}{r} 51738 \\ 49 \\ \hline \hline \end{array}$	$\begin{array}{r} 2136 \\ 44 \\ \hline \hline \end{array}$	$\begin{array}{r} 3702 \\ 15 \\ \hline \hline \end{array}$	$\begin{array}{r} 81369 \\ 63 \\ \hline \hline \end{array}$
---	--	--	---

$\begin{array}{r} 17293 \\ 45 \\ \hline \hline \end{array}$	$\begin{array}{r} 3187 \\ 50 \\ \hline \hline \end{array}$	$\begin{array}{r} 71938 \\ 32 \\ \hline \hline \end{array}$	$\begin{array}{r} 21964 \\ 56 \\ \hline \hline \end{array}$
---	--	---	---

$\begin{array}{r} 31920 \\ 96 \\ \hline \hline \end{array}$	$\begin{array}{r} 41785 \\ 80 \\ \hline \hline \end{array}$	$\begin{array}{r} 3621 \\ 108 \\ \hline \hline \end{array}$	$\begin{array}{r} 413298 \\ 81 \\ \hline \hline \end{array}$
---	---	---	--

14. Subtract 236 from 500, and multiply the result by 56.

15. Add together sixty-three times 251, and fifty-four times 835.

16. Find the product of 28, and 56, and 40.

## DIVISION.

**20.** To divide a number is to separate it into equal parts. There are ten parts in the line in the margin. When divided by five there are two parts. When divided by two there are five. Division is the reverse of multiplication. Thus, if we *divide* twelve shillings among six persons, each of those persons has two shillings, because six times two makes twelve. So on dividing the number 35 into seven parts, we find the number *five*.

*Example of Division.—I.*

Divide 864 by 2.

2)864      The half of eight hundred is 4 hundred ; set  
 ——— down 4 under the hundreds.

432      The half of six tens is 3 tens ; set down 3  
 ——— under the tens.

The half of four is 2 ; set down 2.

Therefore the half of 864 is 432.

*Example of Division.—II.*

Divide 7625 by 7.

7)7625      The seventh part of 7 thousands is one  
 ——— thousand ; set down 1 in the thousands  
 1089-2      place.

The seventh part of 6 hundreds cannot be taken.

There is therefore no figure in the hundreds place in the answer.

The nearest seventh part of 62 tens is 8 tens, or the seventh of 56 tens ; this leaves 6 tens or 60 units undivided ; set down 8 under the 2, and carry the 6 tens to the 5 units.

Sixty-five divided by 7 give 9, and leave 2 undivided ; set down 9, and place 2 as the remainder to the right.

The answer to the question is 1089, and 2 remaining.

**21.** The answer to a question in Division is called the **QUOTIENT**. The dividing number or **DIVISOR** should be set down on the left side, and each figure of the quotient should be set down as it is found, and the remainder carried to the next figure to the right.

## EXERCISE XXVI.

1. What is the fourth part of 84728? Of 212?
2. Divide £200 among five persons. Among ten.
3. What number multiplied by 3 will produce 1236?
4. There are 12 pence in a shilling; how many shillings are there in 504 pence? in 1584 pence? in 3192 pence?
5. If 1000 nuts are distributed among children who are to have 8 apiece, how many children receive them?
6. On a page of 5 columns there are 1525 words; how many are there in each column?
7. In a regiment of 1200 men how many rows could be formed of eight each? Of six each? Of ten each? Of four each?
8. If a sum of £17,038 were left equally between seven persons, how much would each receive?
9. In a street there are in all 1672 windows, each house having 8; how many houses are there?
10. What is the difference between the ninth part and the third part of 95,086?

$$11. \quad 2)42846$$


---

$$12. \quad 3)3579$$


---

$$13. \quad 8)672091 \quad 5)49028$$


---



---

$$14. \quad 7)31685 \quad 10)71986$$


---



---

$$15. \quad 11)43972 \quad 3)2176381$$


---



---

$$16. \quad 4)359851 \quad 12)63987$$


---



---

$$17. \quad 8)31698 \quad 12)57629$$


---



---

$$18. \quad 7)56941 \quad 6)410847$$


---



---

**22.** When the divisor is greater than 12, the process is called LONG DIVISION. The following example shows the method of working each step in such a process:—

*Example of Long Division.*

Divide 73476 by 26.

$$\begin{array}{r}
 (a) \quad 26 \overline{)73476} \left\{ \begin{array}{l} 2000 \\ 800 \\ 20 \\ 6 \end{array} \right. \\
 \underline{52000} \\
 21476 \\
 \underline{20800} \\
 676 \\
 \underline{520} \\
 156 \\
 \underline{156}
 \end{array}$$

Divide 73 thousands by twenty-six, and the nearest answer is proved by trial to be 2, or 2 thousands.

Take 26 times 2 thousands from the dividend.

This leaves 21476 undivided.

Divide 214 hundreds by 26, and the nearest answer is 8, or 8 hundreds.

Take 26 times 800 from the remainder.

This leaves 676 undivided.

In 67 tens 26 is contained 2 times, or 2 tens.

Take 26 times 2 tens from 676.

This leaves 156 undivided.

Divide 156 by 26, and the answer is 6.

There is no remainder.

The answer is 2826.


$$\begin{array}{r}
 (b) \quad 26 \overline{)73476} (2826 \\
 \underline{52} \\
 214 \\
 \underline{208} \\
 67 \\
 \underline{52} \\
 156 \\
 \underline{156}
 \end{array}$$

**NOTE.** It is usual to omit the ciphers shown in (a), and to set down the figures as in (b), bringing down each new figure of the dividend as it is required.



## EXERCISE XXVII.

1. What is the fifteenth part of six hundred?
2. Divide twelve hundred and sixty-eight by twenty-four.
3. How many packets, containing 14 lbs. each, can be made up out of a chest containing 1134 lbs.?
4. Find the forty-seventh part of two millions.
5. What number multiplied by 17 will make 5712?
6. Add together the fifteenth and the sixteenth part of two hundred and forty.
7. A mile contains 63,360 inches. If a number of flagstones measuring 32 inches are laid end to end, how many will be required to extend so far as a mile?
8. There are twenty shillings in £1; how many pounds are there in 3560 shillings?
9. How many times can I take the number 63 out of a thousand?
10. Two hundred and fifty-nine bushels of corn were eaten in a certain time by 37 horses: how many bushels on an average were eaten by each?
11. What is the difference between the twenty-fourth and the twenty-fifth part of twelve thousand?
12. Divide seventeen thousand six hundred and ninety-two by one hundred and twelve.

 Work the following sums in division:—

- |                      |               |             |
|----------------------|---------------|-------------|
| 13. 16)7263          | 31)107,821    | 25)31,690   |
| 14. 711)350,006      | 82)51,472     | 33)98,217   |
| 15. 3024)863,197,281 | 357)862,319   | 13)62,501   |
| 16. 713)627,812      | 305)1,796,831 | 314)816,291 |
| 17. 351)472,098      | 713)542,618   | 18)72,196   |

18. Take 72,638 from a million, and divide the result by 27.

19. Add together 2,163 and 51,027, and divide the sum of those numbers by 135.

**23.** We divide a number by 10, by 100, by 1,000, by 10,000, or by 100,000, when we cut off as many figures as there are ciphers in the divisor. Thus:—

We divide 100 by 10 by cutting off one nought, which leaves 10: 500 divided by 10 becomes 50, one nought having been removed; divided by 100 it becomes 5, two noughts having been removed.

750,000 divided by	100 gives	7,500
" " "	1,000 "	750
4,693,825 divided by	10,000 "	469 and 3,825 rem <sup>r</sup> .
" " "	100,000 "	46 " 93,825 "

**24.** Hence, when there are ciphers at the end of a divisor, we cut off as many figures from the dividend, and divide by the rest of the figures of the divisor.

*Example (a)* Divide 726,837 by 5000.

$$\begin{array}{r} 5,000 \overline{) 726,837} \end{array}$$

145-1837 remainder.

We divide by 1000 by cutting off 3 figures (**23**).

But 726 divided by 5 gives 145 and leaves 1 thousand remaining.

The quotient, therefore, is 145 and 1837 remainder.

*Example (b)* Divide 835,426 by 3700.

$$37,00 \overline{) 8354,26} (225$$

74

—

95

74

—

214

185

—

29

Here we divide by 100 by cutting off the two figures to the right.

We then divide the 8354 by 37 in the usual way.

The answer is 225, with a remainder 29.

The quotient, therefore, is 225, with a remainder 2926.

## EXERCISE XXVIII.

1. Find the hundredth part of 3279.
2. What is the thousandth part of 392,185?
3. Divide 1,769,382 by ten, by a hundred. By a thousand. By ten thousand.
4. Find the hundredth part of 1,769; Of 38,351; Of 52,684; Of 479,382.
5. How many times greater are 3270 than 327? 826,000 than 826? 479,300 than 4793?
6. Divide 479 by sixty.
7. From a total of 47,963 men how many regiments could be told off containing 800 each?
8. How many times are 170 contained in 34,823?
9. Divide 387,256 by 280 and by 28,000.
10. Divide 1,723,865 by 4500.
11. There are 20 shillings in a pound, how many pounds are there in 1080 shillings? In 2370 shillings?
12. There are 60 fourpenny pieces in a pound, how many pounds are there in 7360 fourpenny pieces? In 40,960 fourpenny pieces?
13. Add together 496 and 5080, and divide the result by 320.
14. Multiply 76 by 15, and 238 by 30, and divide the sum of the two products by 30.
15. There are 1760 yards in a mile, how many miles are there in a million yards?
16.  $230)186752($                        $12400)798265($
17.  $5280)326950($                        $31800)2763975($
18.  $15600)279638($                        $320)567928($
19.  $300)379687($                        $12400)719876($
20. What number multiplied by 300 would give 52,797,000?
21. Take 5,286 from two millions, and divide the result by seventeen hundred.

## SIGNS AND THEIR USES.

**25.** The four principal processes in arithmetic are often expressed, for convenience and shortness, by *signs*, as follow :—

+ is the sign of addition, and is called *plus*

Thus  $7 + 9$  is read 7 plus 9, and means 9 *added to* 7.

− is the sign of subtraction, and is called *minus*.

Thus  $9 - 7$  is read 9 *minus* 7, and means 7 *taken from* 9.

× is the sign of multiplication.

Thus  $9 \times 7$  is read 9 *into* 7, and means 9 multiplied by 7.

÷ is the sign of division.

Thus  $20 \div 5$  is read 20 *by* 5, and means 20 divided by 5. This is sometimes expressed by placing the divisor underneath the dividend.  $\frac{20}{5}$  means 20 divided by 5.

= is the sign of equality.

Thus  $5 + 3 = 8$  means 5 with 3 added to it *equals* 8, or is equal to 8.

( ) means that the whole quantity within the bracket is affected by the sign before it. Thus,  $18 - (6 + 3)$  means that the sum of 6 and 3 or 9 must be subtracted from 18. And  $(12 - 7) \times (3 + 4)$  means that  $12 - 7$  or 5 must be multiplied by  $3 + 4$  or 7.

Hence,—

$7 + 9 = 16.$	Seven <i>plus</i> 9 equals 16.
$9 - 7 = 2.$	Nine <i>minus</i> 7 equals 2.
$9 \times 7 = 63.$	Nine multiplied by 7 equals 63.
$20 \div 5 = 4.$	Twenty divided by 5 equals 4.
2s. = 24d.	Two shillings <i>equals</i> 24 pence.
£3 = 60s.	Three pounds <i>equals</i> 60 shillings.

Expressions of this kind, showing equality between two different expressions for the same number, are called **EQUATIONS**.

## EXERCISES IN SIGNS.

## EXERCISE XXIX.

 (a) Read the following expressions:—

$$\begin{array}{r} 8 + 4 \\ 3 \times 6 \end{array}$$

$$\begin{array}{r} 12 - 15 \\ 20 + 8 \end{array}$$

$$\begin{array}{r} 6 + 7 \\ 18 \div 2 \end{array}$$

Four roods = one acre; Two pints = one quart.

Three fourpenny pieces = two sixpences.

(b) Place the true result after the sign of equality in each of these cases:—

$$1. 20 + 16 + 3 = \quad . \quad 2. 18 + 17 - 5 = \quad .$$

$$3. 8 \times 2 \times 5 = \quad . \quad 10 - 5 - 3 = \quad .$$

$$4. \frac{16 \div 9}{5} = \quad . \quad \frac{28 \times 4}{4 + 3} = \quad .$$

$$5. 15 + 16 + 17 - 28 = \quad . \quad 6. 5 \times 8 \times 4 = \quad .$$

$$7. 156 + 230 + 49 + 7 = \quad .$$

$$8. (15 + 8 \times 2) + (12 \times 6 \times 3) = \quad .$$

$$9. 27 - 16 + 187 - (23 + 15) = \quad .$$

$$10. (24 + 17 \div 26 + 33) \div (30 - 5) = \quad .$$

$$11. \frac{262 + 18 - 7}{7 \times 3} = \quad .$$

$$12. 236 \times 15 \times 9 = \quad . \quad 418 + 275 - 63 = \quad .$$

$$13. 540 + 127 \div 165 - (783 - 219) = \quad .$$

$$14. (3401 \times 16) + (542 \times 28) = \quad .$$

$$15. (1746 + 584 - 1926) \times (2347 - 1978) = \quad .$$

$$16. \frac{4132 \times 51}{4278 - 1396} = \quad .$$

(c) Make up six equations similar to those in the exercise, completing them, and employing the signs.

## EXERCISE XXX.

*Miscellaneous Examples of the Simple Rules.*

1. An empty jar weighs 308 grains ; when full of water it weighs 4372 grains, what is the weight of the water ?

2. A person born in 1792 lived 75 years, in what year did he die ?

3. Milton, who was born in 1608, died in the year 1674, how old was he when he died ?

4. A labourer earns 17 shillings a week, how many shillings does he receive in the whole year of 52 weeks ?

5. From a fountain 15 pints of water flow per minute, how many flow in an hour (60 minutes), and in a day (24 hours) ?

6. A man buys cloth for 585 shillings, at 13 shillings per yard, how many yards does he buy ?

7. Add fifteen to twenty, take away five, divide the remainder by six, and multiply the result by seven.

8. There are seven days in a week, how many days are there in 176 weeks ?

9. If a railway train travels 38 miles an hour, how far will it go in 16 hours ?

10. In fifteen bags, containing equal numbers, there are 1980 nuts, how many are in each ?

11. A landowner sold 327 acres of land at £18 per acre, and 278 acres at £23 per acre, what was the total purchase-money ?

12. If a person owed £1200, and paid back at different times £298, £154, £463, and £85, what part of his debt remained unpaid ?

13. Multiply 628 by 156, and divide the product by 700.

14. What is the difference between  $168 + 95 + 64$  and  $16 \times 8 \times 5$  ?

15. If I take 1860 steps in walking a mile, how many shall I take in walking 15 miles and a half ?

16. To what number can I add 768 to make up 1,100?
17. How many pounds weight are there in 7 bags of sugar containing 224 lbs. each; and in eleven bags containing 168 lbs. each?
18. What is the forty-fifth part of a million?
19. A mile is equal to 1,760 yards; how many yards are there in 27 miles? How many in 18 miles?
20. Take 238 from a thousand; and multiply the remainder by thirty-four.
21. Take the number 6, double it, double the result, and again until the sixth time; to what will it amount?
22. What number is that which, multiplied by 64, will give 81,856 as product?
23. Multiply 154 by itself; and the result by the same number.
24.  $(365 + 18 + 279) - (274 + 115)$ .
25. There are four towns with an average population of 11,476 persons each; how many people are there in them all?
26. Find the difference between the twenty-fifth part and the twentieth part of one million.
27. London contained 2,680,735 persons at the census of 1851, 3,222,720 at the census of 1861, and 3,883,092 in 1871; find the increase at each period.
28.  $(623 + 35 + 108) \times (723 - 518)$ .
29. Subtract 374 from 8,000, three times in succession, and find the result.
30. In a spelling-book there are 56 pages, each containing 2 columns of words, and in each column 64 words; how many words are there in all?
31. What is the difference between the sum of 1,684 and 2,132, and the product of 185 and 247?
32. The population of the United Kingdom in 1871 was 31,465,480; of these, 3,358,613 were inhabitants of Scotland, and 5,402,759 of Ireland; how many remained in England and Wales?
33. Find the number of soldiers in an army consisting of five divisions, each division containing eight regiments composed of 1,250 men each.

## MONEY.

**26.** The coins in use in England are—

<i>Gold.</i>	The <i>Sovereign.</i>
	„ <i>Half-sovereign.</i>
<i>Silver.</i>	The <i>Crown</i> , or Five Shilling piece.
	„ <i>Half-crown.</i>
	„ <i>Florin</i> , or Two Shilling piece.
	„ <i>Shilling.</i>
	„ <i>Sixpence.</i>
	„ <i>Fourpenny piece.</i>
	„ <i>Threepenny piece.</i>
<i>Copper.</i>	The <i>Penny.</i>
	„ <i>Halfpenny.</i>
	„ <i>Farthing.</i>

But of the names of these coins only four are used in keeping accounts.

*The following table must be learned by heart :—*

Four Farthings make ONE PENNY.

Twelve Pence „ ONE SHILLING.

Twenty Shillings „ ONE SOVEREIGN, or POUND.

The letters £ s. d. are commonly used to show Pounds, Shillings, and Pence.\*

Thus £1 6s. 7d. is read one pound six shillings and seven pence.

£136 12s. 8d. is read one hundred and thirty-six pounds twelve shillings and eight pence.

Farthings are not separately enumerated, but are always written as parts or fractions of pence. Thus,—

$\frac{1}{4}$  means a fourth of a penny, or a Farthing.

$\frac{1}{2}$  means a half of a penny, or a Halfpenny.

$\frac{3}{4}$  means three-fourths of a penny, or Three Farthings.

Thus 17s. 6 $\frac{1}{4}$ d. is read seventeen shillings and sixpence farthing.

£1 12s. 3 $\frac{1}{2}$ d. is read one pound twelve shillings and threepence halfpenny.

\* These letters are the initials of the names of Roman coins—*Libri, Solidi, Denarii*,—which were not of exactly the same value as pounds, shillings, and pence, although the names are still used.



## EXERCISE XXXI.

*Read the following expressions :—*

1. 16s. 2d., £1 12s. 3d., £45 7s. 10d.
2. £10 19s. 3½d., £27 15s. 6¼d., £239 5s. 1½d.
3. £4028 os. 6¾d., £3192 12s. 0¾d., £1500 6s. 11¼d.

*Write in figures the following sums of money :—*

1. Eightpence, fourpence halfpenny, elevenpence three farthings.
2. One pound twelve and ninepence ; Three pounds five and sixpence halfpenny.
3. Nineteen pounds four and sixpence farthing ; Twenty-four pounds eleven and ninepence halfpenny.
4. Twenty-five pounds and sixpence ; Twelve pounds five shillings and three farthings.

## EXERCISE XXXII.

*Simple Calculations in Money.*

1. How many farthings are there in twopence ? How many pence in three sixpences ?
2. Add together fourpence, fivepence, and sixpence.
3. Add together three farthings and seven farthings.
4. What change will be left on paying 7d. out of 1s. ?
5. What is a quarter of a shilling ? A half of half-a-crown ?
6. If I buy five articles at 2d. each, and seven at 3d. each, how much will they cost ?
7. Out of a two shilling piece I spend 6d., 4d., and 5½d., how much change shall I receive ?
8. Divide sixpence among four children.
9. To how many people can I give twopence each out of half-a-crown ?
10. What is the difference between seven fourpenny pieces and five sixpences ?
11. Add together eight farthings and eight halfpence.
12. How many fourpenny pieces are worth the same as five shillings ?

## MONEY TABLES.

*To be learned by heart.*

## FARTHINGS.

Five farthings	make one penny farthing ...	0	1 ¼
Eight farthings	„ two pence .....	0	2
Twelve farthings	„ three pence .....	0	3
Sixteen farthings	„ four pence .....	0	4
Twenty farthings	„ five pence .....	0	5
Twenty-four farthings	„ six pence .....	0	6
Forty-eight farthings	„ one shilling .....	1	0

## PENCE.

Twelve pence	make one shilling .....	1	0
Twenty pence	„ one shilling and eight pence	1	8
Twenty-four pence	„ two shillings .....	2	0
Thirty pence	„ two shillings and six pence	2	6
Thirty-six pence	„ three shillings .....	3	0
Forty pence	„ three shillings and four pence .....	3	4
Forty-eight pence	„ four shillings .....	4	0
Fifty pence	„ four shillings and two pence	4	2
Sixty pence	„ five shillings .....	5	0
Seventy pence	„ five shillings and ten pence	5	10
Eighty pence	„ six shillings and eight pence	6	8
Ninety pence	„ seven shillings and six pence	7	6
A hundred pence	„ eight shillings and four pence	8	4

## SHILLINGS.

Twenty shillings	make one pound .....	£1	0	0
Twenty-one shillings	„ one guinea * .....	1	1	0
Thirty shillings	„ one pound ten .....	1	10	0
Forty shillings	„ two pounds .....	2	0	0
Fifty shillings	„ two pounds ten .....	2	10	0
Sixty shillings	„ three pounds .....	3	0	0
Seventy shillings	„ three pounds ten ...	3	10	0
Eighty shillings	„ four pounds .....	4	0	0
Ninety shillings	„ four pounds ten ...	4	10	0
One hundred shillings	„ five pounds .....	5	0	0

\* Though guineas are no longer coined, this name for twenty-one shillings is frequently used.

## ADDITION AND SUBTRACTION OF MONEY.

**27.** When sums of money have to be added or subtracted, the pounds, shillings, pence, and farthings should be arranged in columns and dealt with separately.

*Example I.* Add together £1 7s. 6d., 18s. 9d., £3 6s. 5d.

£	s.	d.
1	7	6
0	18	9
3	6	5
<hr style="border: none; border-top: 1px solid black; margin: 5px 0;"/>		
5	12	8
<hr style="border: none; border-top: 1px solid black; margin: 5px 0;"/>		

We first add the pence. 5 and 9 and 6 make 20. But as 12 pence make one shilling, 20 pence make 1 shilling and 8 pence.

Set down 8 under the pence, and carry 1 to the shillings. 1 and 6 and 18 and 7 make 32 shillings.

But as 20 shillings make 1 pound, 32 shillings make £1 and 12 shillings.

Set down 12 shillings and carry £1 to the pounds. 1, 3 and 1 make £5.

Set down 5 under the pounds.

The answer is £5 12s. 8d.

*Example II.* Take £16 3s. 4½d. from £27 18s. 6¾d.

£	s.	d.
27	18	6¾
16	3	4½
<hr style="border: none; border-top: 1px solid black; margin: 5px 0;"/>		
11	15	2¼
<hr style="border: none; border-top: 1px solid black; margin: 5px 0;"/>		

Take a halfpenny from three farthings, one farthing remains. Set it down in the farthings place.

Take fourpence from sixpence. Two pence remain, and must be set down under the pence.

Take three shillings from eighteen, fifteen remain, and must be set down under the shillings.

Sixteen pounds from twenty-seven leave eleven.

The answer is eleven pounds fifteen shillings and two-pence farthing.

## EXERCISE XXXIII.

1. Add together 2s. 6d., 18s. 4d., and £1 13s. 9d.
2. Find the amount of £2 14s. 7d., £1 16s. 3d., £12 6s. 8d., and £17 2s. 4d.
3. Subtract £3 10s. from £5 18s. 7d.
4. What is the difference between £123 12s. 9d. and £71 5s. 4d.?

5.	£ s. d.	£ s. d.	£ s. d.
	18 7 10	27 15 8	234 2 9
	6 12 0	19 6 7	19 18 4
	0 15 9	324 12 4	123 6 7
	24 13 6	9 5 8	5 10 0
	_____	_____	_____
	_____	_____	_____

*Work the following subtractions :—*

6.	£ s. d.	£ s. d.	£ s. d.
	24 12 8	319 6 5	200 18 7 $\frac{3}{4}$
	12 7 5	28 3 2	172 12 6 $\frac{1}{2}$
	_____	_____	_____
	_____	_____	_____

7. If I buy coffee for 3s. 8d., tea for 5s. 4d., sugar for 11 $\frac{1}{2}$ d., and soap for 1s. 4d., how much shall I spend?

8. Add together a sovereign, a half-crown, three sixpences, four shillings, and sevenpence halfpenny.

9. At a stationer's I bought 3 quires of paper for 10d., some envelopes for 6d., two books, of which one cost 3s. 6d. and the other 4s. 8d., and some newspapers for 9d.; so how much did my bill amount to?

10. To what sum will the following coins amount:— five sovereigns, six half-sovereigns, three crowns, eight florins, and sixteen pence?

11. Add together fifty guineas and seventeen pounds, and subtract forty-seven pounds five shillings from the result.

ADDITION OF MONEY—*continued.*

28. It is required to add together the following sums of money:—£1314 16s. 7d., £2038 12s. 9½d., £1 10s., £316 5s. 4¼d., £40916 12s. 8¾d., and £1008 16s. 5d.

Add up three farthings, one farthing, and one halfpenny. They make six farthings, or one penny halfpenny. Set down a halfpenny and carry one penny.

One and 5 and 8 and 4 and 9 and 7 make 34 pence. Thirty-four pence are 2 shillings and 10 pence. Set down 10 pence and carry 2 shillings.

Two and 16 and 12 and 5 and 10 and 12 and 16 make 73. Seventy-three shillings, 3 pounds 13 shillings. Set down 13 shillings and carry 3 pounds.

Three and 8 and 6 and 6 and 1 and 8 and 4 make 36 pounds. Set down 6 and carry 3 to the tens.

Three and 1 and 1 and 3 and 1 make 9 tens. Set down 9.

Nine and 3 and 3 make 15 hundreds. Set down 5 hundreds and carry 1 to the thousands.

One and 2 and 1 make 4 thousands. Also set down 4 tens of thousands.

The answer is 44 thousand five hundred and ninety-six Pounds thirteen Shillings and ten Pence halfpenny.

EXERCISE XXXIV.

1. Add together £175 12s. 3d., £2096 15s. 4½d., £18 17s. 9¼d., and £4036 12s. 8¾d.

2. £179 14s. 9½d. + £206 11s. 5d. + £18 3s. 7½d., + £3207 11s. 7¼d.

3. £2317 13s. 9¼d. + £6235 17s. 2d. + £480 12s. 2¼d. + £3196 10s. + £86 15s. 3d.

4. £75 15s. 8½d. + £1125 16s. 8d. + £726 13s. 9¼d. + £3271 10s. 6½d.

5. £854 7s. 2d. + £106 11s. 5¼d. + £1032 15s. 8½d. + £6195 14s. 7½d.

6. £2136 13s. 6d. + £732 10s. 8¼d. + £31 19s. 9¾d. + £62 15s. 8d. + £1053 15s. 6d.

7. If I have in my purse three £5 notes, four sovereigns, and five half-sovereigns, three half-crowns, a florin, seven shillings, five sixpences, two fourpenny pieces, and five threepenny pieces, what sum have I in all?

8. A debtor owes to five creditors £189 15s., £235 16s. 3d., £108 17s. 4d., £50, and £97 10s. : how much does he owe altogether?

9. Add together fifty pounds, fifty shillings, and fifty pence.

10.	£	s.	d.	£	s.	d.	£	s.	d.
	2083	17	3	1796	3	5¼	19	7	6
	156	4	9½	28	17	9	234	15	8
	1	10	0	354	12	4	0	18	7¼
	28	12	6¼	9	10	6	65	12	4½
	375	4	8	2038	12	2½	5098	4	7
	19	2	6	139	5	7¼	325	16	8
	<hr/>			<hr/>			<hr/>		

11.	£	s.	d.	£	s.	d.	£	s.	d.
	1275	6	7	30528	11	2½	3271	14	7
	5196	14	8¾	1976	6	5¼	596	19	9½
	20127	8	6	287	14	2¾	1827	15	7¾
	37	15	5½	4096	2	8	74	9	4½
	549	7	8¾	17278	15	6	20756	11	2¾
	1726	12	2	3197	12	8	1982	7	9
	9	15	8½	150	10	0	638	17	4
	<hr/>			<hr/>			<hr/>		

12. Add together all the English coins in present use. (See page 44.)

13.	£	s.	d.	£	s.	d.	£	s.	d.
	2867	14	10	3165	2	8½	2167	4	9
	598	7	4½	1	19	2½	31287	5	6½
	1365	12	6	472	16	7	2172	19	2
	209	18	2¼	1096	18	6¼	66	5	6¼
	4718	6	3	12718	5	7	1096	12	4½
	17	12	10	3127	11	11	723	8	5
	<hr/>			<hr/>			<hr/>		
	<hr/>			<hr/>			<hr/>		

SUBTRACTION OF MONEY—*continued.*

**29.** When, in any subtraction of money sum, the number in the upper line is less than that below it, the method of equal additions described in **4** must be used. It was there necessary to add ten to each line, because hundreds, thousands, &c., differ from each other by tens. But here it will be necessary to add a penny, a shilling, or a pound to each line, in order to work the subtraction.

*Example I.* Subtract £9 12s. 7d. from £15 16s. 3d.

£	s.	d.
15	16	3
9	12	7
<hr/>		
6	3	8
<hr/>		

£	s.	d.
15	16	15
9	13	7
<hr/>		
6	3	8
<hr/>		

We can take the less sum from the greater; but we cannot take 7 pence from 3 pence.

Add a shilling or 12 pence to the 3 pence in the upper line. Take 7 from 15 pence; there remain 8d. Set it down.

Add a shilling to the lower line. Twelve and 1 are 13. Take 13 from 16. Set down the 3 shillings which remain. Take 9 from 15. Set down the £6 which remain.

The answer is £6 3s. 8d.

One shilling has been added to both lines; to the upper in the form of 12 pence, to the lower in the form of one shilling.

*Example II.* Find the difference between £1250 10s. 6¼d. and £768 12s. 9½d.

$$\begin{array}{r}
 \text{£} \quad \text{s.} \quad \text{d.} \\
 (a) \quad 1250 \quad 10 \quad 6\frac{1}{4} \\
 \quad \quad 768 \quad 12 \quad 9\frac{1}{2} \\
 \hline
 \quad \quad 481 \quad 17 \quad 8\frac{3}{4} \\
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{£} \quad \text{s.} \quad \text{d.} \quad \text{f.} \\
 (b) \quad 12 \mid 15 \mid 10 \text{ ,, } 30 \text{ ,, } 18 \text{ ,, } 5 \\
 \quad \quad 8 \mid 7 \mid 9 \text{ ,, } 13 \text{ ,, } 10 \text{ ,, } 2 \\
 \hline
 \quad \quad 4 \mid 8 \mid 1 \text{ ,, } 17 \text{ ,, } 8 \text{ ,, } 3 \\
 \hline
 \hline
 \end{array}$$

We cannot take a half-penny from a farthing.

Add a penny (four farthings) to the upper line.

Two farthings from 5 leave three farthings to be set down.

Add a penny to the 9 pence of the lower line. Ten pence from 6 pence cannot be taken. Add 12 pence to the upper line.

Ten pence from 18 pence leave 8 pence, to be set down.

Add a shilling to the lower line. Thirteen shil-

lings from 10 shillings cannot be taken. So add 20 shillings to the upper line.

Thirteen shillings from 30 shillings leaves 17 to be set down.

Add £1 to the lower line. Nine pounds from 0 cannot be taken. Add £10 to the upper line.

Nine pounds from 10 leaves £1 to be set down.

Add £10 to the lower line. Seven tens from 5 tens cannot be taken, so add 10 tens to the upper line. There remain 8 tens to be set down.

Add 100 to the lower line. Eight hundred from 12 hundred leaves 4 hundred to be set down.

The difference is £481 17s. 8¾d.

NOTE.—On comparing (a), which is the sum as ordinarily set down, with (b), the sum as actually worked, it will be seen that a penny, a shilling, a pound, £10, and £100 have been successively added to both the upper and lower lines.



EXERCISE XXXV.

1. Add together four shillings, four half-crowns, four sixpences, and four pence, and take the sum from £1.

2. Take £75 14s. 6d. three times from £350 10s., and say how much remains at last.

3. What profit does a tradesman gain who buys goods for £45 10s., and sells part of them for £17 9s. 6d., and the rest for £33 16s. 10d.?

4. On offering to pay my tailor £19 4s. 6d. he allows me 19s. 3d. discount: what sum do I actually pay?

5. A gentleman leaves at death £1,256 to be divided among four daughters, of whom the first is to have 200 guineas, the second 250 guineas, and the third three hundred: what sum remains for the fourth?

	£	s.	d.		£	s.	d.		£	s.	d.
6.	2582	15	4½	.	3287	11	5		2056	13	6
	196	8	6		1965	4	8½		1978	12	8
	<hr/>				<hr/>				<hr/>		

	£	s.	d.		£	s.	d.		£	s.	d.
7.	3069	10	0		17862	11	3½		3000	0	0
	274	5	7¼		2974	5	6		287	13	6½
	<hr/>				<hr/>				<hr/>		

8. £1792 13s. 8d. + £236 14s. 7½d. — £1050 18s. 10d.

9. £2387 15s. 6d. + £35 14s. 2d. + £928 12s. 6d. — £3154 7s. 6d.

10. Add together £75 13s. 6½d., £219 10s. 11d., and £518 4s. 6d., and subtract the result from £1000.

11. Add together fifty-four farthings, fifty-four shillings, and fifty-four pence.

12. Find the difference between forty-nine fourpenny pieces and thirty-nine sixpences.

13. What sum of money is that which must be added to £25 15s. 6¾d. to make £100? Prove the answer by adding it.

14. How much is left after taking £35 7s. 6d. twice over from £120 10s.?

## MULTIPLICATION OF MONEY.

**30.** When any sum of money is to be multiplied, the farthings, pence, shillings, and pounds must be separately multiplied in order, and the results set down and carried as in addition.

*Example I.* Multiply £26 10s. 4½d. by 4.

£	s.	d.		Four times a halfpenny are 8 farthings,
26	10	4½	or 2 pence.	
		4		Carry 2 to the pence.
<hr style="width: 100%;"/>				Four times four are 16 pence, and 2 make
106	1	6		18 pence, or 1 shilling and 6 pence.
<hr style="width: 100%;"/>				Set down 6 pence and carry 1 to the
				shillings.

Four times 10 are 40 shillings, and 1 make 41; 41 shillings are 2 pounds 1 shilling.

Set down 1 shilling and carry 2 to the pounds.

Four times 6 are 24, and 2 make 26.

Set down 6 pounds and carry 2 to the tens.

Four times 2 tens are 8 tens, and 2 make 10 tens.

Set down 10.

The answer is £106 1s. 6d.

## EXERCISE XXXVI.

1. Multiply 2s. 6d. by 5; £1 12s. 4d. by 6.
2. Multiply £2 3s. 8¼d. by 7; £6 2s. 7d. by 3.
3. Five pairs of gloves cost 1s. 7½d. each: what is the price of all?
4. Add together the cost of six books at 3s. 6d., and four at 5s. 6d. each.
5. What sum is that which, given among eight persons, allows them to receive £12 17s. 6d. each?
6. Find the price of 3 lbs. of sugar at 4½d., 2 lbs. of coffee at 1s. 8d., and 4 lbs. of tea at 3s. 4d. per lb.

£	s.	d.	£	s.	d.	£	s.	d.
7.	10	11	2	6	7	13	17	9¾
		8½						
		4			5			2
<hr style="width: 100%;"/>			<hr style="width: 100%;"/>			<hr style="width: 100%;"/>		
<hr style="width: 100%;"/>			<hr style="width: 100%;"/>			<hr style="width: 100%;"/>		

<p>8.     £   s.   d.       21   6   2<math>\frac{3}{4}</math>               6 ----- -----       £   s.   d.       123   6   4<math>\frac{1}{2}</math>               9 ----- -----</p>	<p>      £   s.   d.       18   7   4               7 ----- -----       £   s.   d.       3   18   10               4 ----- -----</p>	<p>      £   s.   d.       19   3   7<math>\frac{1}{4}</math>               8 ----- -----       £   s.   d.       24   12   3<math>\frac{1}{2}</math>               8 ----- -----</p>
--	---	---

10. £2 4s. 6d. × 12 ; 19s. 6 $\frac{1}{2}$ d. × 8.

11. £17 6s. 3d. × 9 ; £2 8s. 5 $\frac{1}{4}$ d. × 6.

12. £10 10s. 10d. × 10.

13. £3 18s. 7 $\frac{1}{4}$ d. × 8 ; £1 9s. 7 $\frac{3}{4}$ d. × 12.

14. £43 2s. 6d. × 11 ; £1 10s. 4d. × 6.

15. A man bequeaths to seven institutions nineteen guineas each : how much is that in all ?

16. In each of nine bags of money there are twenty-four sovereigns, fifteen half-sovereigns, twenty-one half-crowns, and eighteen shillings : what sum is contained in them all ?

17. What sum must be divided in order to give to eleven persons a legacy of £49 12s. 6d. each ?

18. If I pay five bills averaging £18 17s. 8d. each, what change will remain from £100 ?

19. What is the difference between seven times £1 16s. 3d. and nine times £1 4s. 7d. ?

20. (£2 16s. 7d. + £5 18s. 8d.) × (12 - 3).

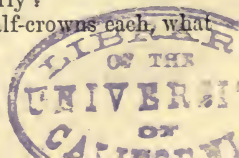
21. (£256 12s. 6d. + £129 10s. - £183 3s. 4d.) × (7 + 4).

22. Add ten times £295 5s. 10d. to eight times £154 13s. 4 $\frac{1}{2}$ d.

23. Multiply £78 6s. 5 $\frac{1}{4}$ d. by seven, and the result by five.

24. What does an employer pay to 12 workmen, each of whom receives £54 12s. 8d. yearly ?

25. If eight persons receive nine half-crowns each, what sum is received by them in all ?



## LONG MULTIPLICATION.

**31.** When the multiplier is more than 12, it is necessary to proceed by steps, as in **19**, Example (i).

*Example I.* Multiply £17 3s. 6d. by 35

Here, because  $35 = 5 \times 7$ , we multiply by 7 and by 5 in succession, and the second product is the answer required.

$$\begin{array}{r}
 \text{£} \quad \text{s.} \quad \text{d.} \\
 17 \quad 3 \quad 6 \\
 \phantom{17} \phantom{3} \quad 7 \\
 \hline
 120 \quad 4 \quad 6 = \text{£}17 \text{ 3s. 6d.} \times 7. \\
 \phantom{120} \phantom{4} \quad 5 \\
 \hline
 601 \quad 2 \quad 6 = \text{£}17 \text{ 3s. 6d.} \times 7 \times 5. \\
 \hline
 \hline
 \end{array}$$

*Example II.* Multiply £254 13s. 8½d. by 58.

Here the multiplier 58 is not a product of any two numbers in the tables. We therefore take the nearest 56 equals  $7 \times 8$ ; and after multiplying the number by 56, we add twice the upper line to make up 58.

$$\begin{array}{r}
 \text{£} \quad \text{s.} \quad \text{d.} \\
 254 \quad 13 \quad 8\frac{1}{2} \\
 \phantom{254} \phantom{13} \quad 7 \\
 \hline
 1782 \quad 15 \quad 11\frac{1}{2} = 7 \text{ times the upper line.} \\
 \phantom{1782} \phantom{15} \quad 8 \\
 \hline
 14262 \quad 7 \quad 8 = 56 \text{ or } 7 \times 8 \text{ times the upper line.} \\
 509 \quad 7 \quad 5 = \text{twice the upper line.} \\
 \hline
 14771 \quad 15 \quad 1 = 58 \text{ times the upper line.} \\
 \hline
 \hline
 \end{array}$$

The answer is £14771 15s. 1d.

## EXERCISE XXXVII.

1. Multiply £3 10s. 4d. by thirteen.
2. Multiply £26 15s. 3½d. by seventeen.
3. Multiply £54 15s. 8¼d. by nineteen.
4. Add together five times £2 3s. 6d., and twenty-three times 17s. 9d.
5. What will 47 pairs of boots cost at £1 1s. 6d. per pair?
6. Find the price of three dozen articles at £2 15s. 9d. each.
7. What will 59 acres of land cost at £22 10s. per acre?

8. Multiply £37 15s. 6d. by 73, and subtract £1250 6s. 4d. from the product.

- |                           |                       |
|---------------------------|-----------------------|
| 9. £28 13s. 6d. × 19;     | £12 14s. 7½d. × 23.   |
| 10. £220 10s. 4½d. × 41;  | £153 16s. 8¼d. × 26.  |
| 11. £274 10s. 2d. × 30;   | £832 15s. 2¼d. × 23.  |
| 12. £1 16s. 5¾d. × 37;    | £1862 12s. 4½d. × 53. |
| 13. £216 10s. 10¼d. × 17; | £10 12s. 3½d. × 29.   |
| 14. £107 3s. 11¼d. × 53;  | £617 2s. 9d. × 46.    |

15.	<table style="border-collapse: collapse;"> <tr><td style="padding-right: 10px;">£</td><td style="padding-right: 10px;">s.</td><td>d.</td></tr> <tr><td style="padding-right: 10px;">683</td><td style="padding-right: 10px;">5</td><td>2</td></tr> <tr><td></td><td></td><td style="text-align: right;">31</td></tr> <tr><td colspan="3" style="border-top: 1px solid black; border-bottom: 1px solid black;"></td></tr> </table>	£	s.	d.	683	5	2			31			
£	s.	d.											
683	5	2											
		31											

	<table style="border-collapse: collapse;"> <tr><td style="padding-right: 10px;">£</td><td style="padding-right: 10px;">s.</td><td>d.</td></tr> <tr><td style="padding-right: 10px;">7294</td><td style="padding-right: 10px;">10</td><td>4½</td></tr> <tr><td></td><td></td><td style="text-align: right;">19</td></tr> <tr><td colspan="3" style="border-top: 1px solid black; border-bottom: 1px solid black;"></td></tr> </table>	£	s.	d.	7294	10	4½			19			
£	s.	d.											
7294	10	4½											
		19											

16. Find the total cost of twenty-three articles at £1 9s. 6d. each, and of thirty-five articles at 17s. 8½d. each.

17. What is the value of 24 casks of wine, each worth £15 4s. 7d.?

18. Deduct fifteen times £23 4s. 6d. from £1000.

19. If a draper buys seventy-five shawls at £3 17s. 6d. each, and sells them at four guineas and a half each, what profit does he gain?

20. What is the cost of 19 tons of iron at £9 9s. 6d. per ton?

## HOUSEHOLD ACCOUNTS AND SIMPLE BILLS.


**32.** The most frequent use to which easy Multiplication and Addition of money are put is the calculation of small accounts after making purchases at shops.

*Example I.* If I buy at a stationer's six quires of note-paper at  $4\frac{1}{2}$ d., three packets of envelopes at 8d. each, some drawing-paper for 1s. 3d., five black-lead pencils at  $3\frac{1}{2}$ d., two boxes of steel pens at 1s. 6d. each, and an inkstand for 4s. 6d., how much do I spend?

It is usual to arrange such an account thus:—

	s.	d.
6 quires of note-paper at $4\frac{1}{2}$ d. ...	2	3
3 packets of envelopes at 8d. ...	2	0
Drawing-paper ... ..	1	3
5 pencils at $3\frac{1}{2}$ d. ... ..	1	$5\frac{1}{2}$
2 boxes steel pens at 1s. 6d. ...	3	0
Inkstand ... ..	4	6
	14 5 $\frac{1}{2}$	

## EXERCISE XXXVIII.

 Compute and finish the following accounts:—

	s.	d.
1. 5 lbs. of rice at $3\frac{1}{2}$ d. per lb. ...		
6 lbs. of soap at 5d. ...		
8 lbs. of Valencia raisins at $6\frac{1}{2}$ d. ...		
3 packets of starch at $5\frac{3}{4}$ d. ...		
6 tablets of soap at 3d. ...		
5 quires of paper at 7d. ...		
2 quires of foolscap at $9\frac{1}{2}$ d. ...		
8 packets of envelopes at 4d. ...		
4 magazines at 9d. ...		
7 prayer-books at 2s. 3d. ...		

s. d.

2. 4 lbs. of tea at 3s. 6d. ...  
 5 lbs. of coffee at 1s. 8d. ...  
 7 lbs. of loaf sugar at 6½d. ...  
 6 lbs. of moist sugar at 4½d. ...  
 3 pairs of gloves at 3s. 9d. ...  
 2 neckties at 1s. 6d. ...  
 4 pairs of stockings at 2s. 2d. ...  
 3 silk handkerchiefs at 3s. 6d. ...
- 

3. 13 yards longcloth at 3¾d., 25 yards shirting at 8½d.,  
 2 dozen napkins at 1s. 4d. each, 3 tablecovers at 8s. od.  
 each.

4. 19 yards black silk at 5s. 2d. per yard, 5 yards crape  
 at 6s. 6d., 12 yards black alpaca at 1s. 7d., and 3 pairs kid  
 gloves at 2s. 8d.

5. 2 bottles of pickle at 10½d., 3 of fruit at 9d., 1 bottle  
 of blacking at 1s. 2d., 9 lbs. of candles at 6½d. per lb.

6. 5 pairs cotton hose at 1s. 9d., 6 pairs worsted at  
 2s. 3½d., 4 pairs merino at 3s. 2d. per pair, and 2 dozen  
 children's socks at 7½d. per pair.

7. 27½ yards of carpet at 4s. 9d. per yard, 27½ of felt  
 at 9½d., making the same 27½ yards at 4d. per yard; stair  
 carpet, 27 yards at 3s. 9d.; two dozen stair rods at 2½d.  
 each.

8. Two dozen port at 48s. per dozen, 2 dozen pale  
 sherry at 46s., 3 dozen Sauterne at 24s., 4 dozen pints of  
 claret at 13s.

9. 3 pairs lace curtains at 23s. 9d. per pair; tapes,  
 rings, &c., for the same, 6s. 6d.; making up and fixing  
 same, 18s. 6d. 18 yards grey silk at 6s. 9d.; 14 yards of  
 muslin at 8½d.

10. Making and fixing 3 window-blinds for drawing-  
 room (2 at 18s. 4d. each, 1 at 12s. 10d.); 7 blinds for  
 bedrooms (viz., 2 at 11s. 8d. each, 1 at 7s. 6d., and 4 at  
 6s. 2d. each); rods, screws, lines, &c., for fixing, 6s. 6d.  
 Altering spring rollers, 4s. 6d., cleaning and repairing  
 outside blinds, £1 3s.

## SIMPLE REDUCTION, AND OTHER USES OF MULTIPLICATION.

**33. Example I.** How many pence are there in £23?  
 £23  
 20  
 ———  
 460 = shillings in £23.  
 12  
 ———  
 5520 = pence in £23.  
 ———  
 Hence there are 5520 pence in £23.

Because there are 20 shillings in £1:

There are in £23 20 times

23 shillings, or 460 shillings.

And because there are 12 pence in a shilling, there are in 460 shillings 12 times 460, or 5520 pence.

*Example II.* Reduce £59 16s. 2½d. to farthings.

£59 16s. 2½d.  
 20  
 ———  
 1196 = shillings in £59 16s.  
 12  
 ———  
 14354 = pence in £59 16s. 2d.  
 4  
 ———  
 57417 farthings in £59 16s. 2½d.

We multiply £59 by 20, and add in the 16 shillings.

There are thus 1196 shillings in £59 16s.

We multiply 1196 by 12, and add in the 2 pence.

There are thus 14354 pence in £59 16s. 2d.

We multiply 14354 by 4, and add in the 1 farthing.

There are thus 57417 farthings in £59 16s. 2½d.

*Example III.* How many fourpenny pieces are there in £139 15s.?

£ s. d.  
 139 15 0  
 20  
 ———  
 2795  
 3  
 ———  
 8385

We multiply £139 by 20, and add in the 15 shillings. There are 2795 shillings in £139 15s.

But there are three fourpenny pieces in a shilling. Therefore we multiply 2795 shillings by 3.

There are thus 8385 fourpenny pieces in £139 15s.



## EXERCISE XXXIX.

1. Reduce £1769 to shillings; £18 10s. to pence.
2. How many sixpences are there in £1385 5s.?
3. If there were a coin worth two pence, how many could I have in change for two guineas?
4. Reduce £3 19s. 6 $\frac{3}{4}$ d. to farthings.
5. Find the price of 17 articles at 2 $\frac{1}{2}$ d. each.
6. How many things worth three halfpence each can I buy for 5s.?
7. Find the difference between the number of four-penny pieces and the number of threepenny pieces in £2 15s.
8. In seventeen half-crowns how many pence?
9. If I changed a five-pound note into threepenny pieces, how many should I have?
10. How many more shillings are there than half-crowns in twenty guineas?
11. Reduce the two sums £12 16s 3 $\frac{1}{2}$ d. and £24 7s. 9d. to farthings.
12. Find the difference in pence between £36 14s. 8d. and £50.
13. Divide £175 16s. 9d. by 3, and give the answer in farthings.
14. How many halfpence are equal in value to twelve bags of money containing £1 16s. 3d. each?
15. Multiply £763 18s. 4d. by 15, and reduce the answer to pence.
16. How many halfpence are there in seventeen guineas?
17. How many farthings are there in seven times £18 6s. 4 $\frac{1}{4}$ d.?
18. Find the total number of farthings in nine guineas, three half-sovereigns, and fifteen half-crowns and seven sixpences.
19. How many articles worth three halfpence each could I buy for £57 10s.?
20. Add the number of farthings in seven hundred and fifty pounds to the number of shillings in the same sum.

## DIVISION OF MONEY.

**34.** In dividing a sum of money, pounds, shillings, pence, and farthings must be separately divided in succession, and when there is any remainder, it must be reduced to the term next below it.

*Example I.* Divide £33 6s. 3d. by three.

£	s.	d.	We find one-third of £33 by the
3)33	6	3	method of simple division, <b>16.</b>
11	2	1	The answer is £11.

A third of 6s. is 2s.

The third of 3d. is 1 penny.

The answer is £11 2s. 3d :

*Example II.* Divide £164 11s. 4½d. by 7.

£	s.	d.	We divide 164 by
7)164	11	4½	7, and find the quo-
23	10	2¼	tient to be £23 with

a remainder, £3.

Now £3 and 11s. reduced to shillings make 71 shillings.

The seventh of 71 is 10, with a remainder of 1 shilling.

One shilling and fourpence make 16 pence.

The seventh of 16 is 2, with a remainder of 2 pence.

2 pence and ½d. reduced to farthings make 10 farthings.

The seventh of 10 is 1, with 3 farthings remainder.

The nearest answer therefore is £23 10s. 2¼d., with three farthings remaining undivided.

## EXERCISE XL.

1. What is the fourth part of £1 10s. ?
2. Divide £26 by five.
3. Add the half of £10 10s. to the third part of the same sum.
4. If £250 10s. are left to be divided among 6 persons, how much will each receive ?
5. £18 have to be divided among 10 persons : how much will each receive ?

6. From the half of five guineas take the third of five guineas.

$$7. \quad \begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 8)7 \quad 2 \quad 6 \\ \hline \end{array}$$

$$7)23 \quad 10 \quad 4 \\ \hline$$

$$8. \quad \begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 10)123 \quad 16 \quad 8 \\ \hline \end{array}$$

$$11)25 \quad 2 \quad 9 \\ \hline$$

9. £18 12s. 6d. ÷ 10;      £24 5s. 7d. ÷ 7.

10. £38 17s. 3d. ÷ 11;      £19 6s. 5d. ÷ 12.

11. £37 15s. 3d. ÷ 5;      £184 10s. ÷ 8.

12. £207 15s. 6d. ÷ 6;      £327 14s. 8d. ÷ 9.

13. Add together the eighth and the tenth parts of £53 12s. 6d.

14. Take the twelfth part of £126 3s. from the whole of that sum.

15. A gentleman bequeaths £1250, of which one-half is given to his eldest son, one-third to his second son, and the remainder in charities; how much money is given to each purpose?

16.  $\text{£}213 \ 17\text{s.} \ 6\text{d.} + \text{£}519 \ 12\text{s.} \ 8\text{d.}$

17.  $\text{£}504 \ 10\text{s.} - \text{£}196 \ 13\text{s.} \ 4\text{d.}$

18.  $\text{£}27 \ 15\text{s.} \ 6\frac{1}{2}\text{d.} + \text{£}196 \ 18\text{s.} \ 7\text{d.} - \text{£}59 \ 10\text{s.} \ 4\frac{1}{4}\text{d.}$

19.  $\text{£}325 \ 16\text{s.} \ 7\text{d.} \times 10$

20. Find the difference between the eighth and the twelfth parts of £1250.

21. If the sum of £1827 19s. 6d. be divided into nine parts, of which A receives five, and B four, what is the share of each?

22. Divide a legacy of £8757 2s. among three persons, so that the first shall have five parts, the second four parts, and the third two parts.

DIVISION OF MONEY (*continued*).

**35.** When the divisor is greater than 12, each remainder must be set down separately, and the work done as in Long Division (**22**).

*Example.* Divide £7135 16s. 4d. by 27.

£      s.      d.      £  
27)7135 16 4(264

54

173

162

115

108

7

20

27)156(5 shillings.

135

21

12

27)256(9 pence.

243

13

4

27)52(1 farthing.

27

25 farthings remain undivided.

We first divide £7135 by 27, as in **22**.

The quotient is £264, and £7 are left undivided.

We next reduce these £7 and the 16s. to shillings. They make 156 shillings.

On dividing 156 by 27, the nearest answer is 5s., and 21 shillings remain undivided.

We next reduce these 21 shillings and 4d. to pence. They make 256 pence.

On dividing 256 by 27 we find the quotient to be 9 pence, and 13 pence remain undivided.

We next reduce the 13 pence to 52 farthings.

On dividing these 52 by 27 we find the quotient 1, and a remainder of 25 farthings which cannot be divided by 27.

The answer is, therefore, £264 5s. 9¼d., and 25 remainder.

## EXERCISE XLI.

1. Find the thirteenth part of £300.
2. Divide £723 10s. by sixteen, and by eighteen.
3. Add together £716 10s. and £138 4s. 7d., and divide the sum by nineteen.
4. Find the difference between the fifteenth and the sixteenth of £1000.
5. A gentleman leaves £10,000, of which one-half is to be paid to his widow, one-third to be equally divided among his six children, and the rest among his four nephews: how much is received by each child and by each nephew?
6. £834 10s. + £17 16s. + £147 12s. 8d. ÷ 17.
7. £1250 ÷ 24; £638 10s. 6d. ÷ 27.
8. £139 2s. 4d. ÷ 15; £3168 16s. 2d. ÷ 33.
9. £274 12s. 0d. ÷ 29; £8357 5s. ÷ 52.
10. £7265 14s. 6d. ÷ 37; £1273 4s. 6d. ÷ 45.
11. £2198 14s. 6d. ÷ 18; £3125 12s. 6d. ÷ 29.
12. £3186 12s. 10d. ÷ 65; £2500 ÷ 73.
13. Add together £568 13s. 7d.; £246 10s. 5d.; and £1200; and divide the sum by 24.
14. If a prize equal in value to £1728 is captured at sea, and one-third is distributed among the officers, and the remainder among 68 men, what is each seaman's share?
15. Divide the sum of £583 into 960 equal parts.
16.  $\frac{£138\ 16s.\ 7d. + £153\ 14s.\ 10d.}{29}$
17.  $\frac{£1347\ 5s.\ 6\frac{1}{2}d. - £216\ 5s.\ 8d.}{47}$
18. Add together the thirty-second and forty-eighth parts of £1625.
19. Divide £3147 15s. by forty-seven, and reduce the quotient to farthings.
20. Part £1000 between two persons in such a way that fifteen parts shall be received by one for every seventeen parts received by the other.

## REDUCTION, AND OTHER USES OF DIVISION.

**36.** When it is required to reduce any number of farthings into pence, or any sum of money into another of higher value, the sum must be worked by Division.

*Example I.* What is the value of 10,000 farthings ?

4) 10,000 farthings.

—————

12) 2,500 pence.

—————

20) 208 shillings, and 4 pence remaining.

—————

10 pounds, and 8 shillings remaining.

—————

Because 4 farthings are 1 penny ;

Therefore we divide 10,000 farthings by 4.

There are 2,500 pence in 4 farthings.

But because 12 pence make one shilling ;

We divide 2500 pence by 12 to reduce it to shillings.

There are 208 shillings and 4 pence in 2500 pence.

But because there are 20 shillings in £1,

We divide 208 shillings by 20.

There are £10 and 8 shillings in 208 shillings.

Therefore ten thousand farthings are found to equal £10 8s. 4d.

**37.** When it is required to find how many sums of one value are contained in another, both sums must be reduced to the same name before the division is worked.

*Example II.* How many times can I take 4s. 3d. out of £5 10s. ?

By **33** we find that £5 10s. contains 1320 pence ; and 4s. 3d. contains 51 pence.

The question is, therefore, how many times are 51 pence contained in 1320 pence ?

We divide 1320 by 51.  $1320 \div 51 = 25$  times and 49 remainder. The answer is therefore 25 times, leaving a remainder of 49 pence.

## EXERCISE XLII.

1. How many pence are there in £5 10s.?
2. How many pounds are there in 1683 farthings?
3. Reduce 22,840 pence to shillings and pounds.
4. How many coins worth five farthings each could I have in change for £4?
5. What is the difference between 5000 halfpence and 7350 farthings?
6. Reduce to pounds, shillings, and pence, the following sums:—
  - (a) 18,364 farthings; 23,086 halfpence; 4196 pence.
  - (b) 27,463 fourpenny pieces; 8165 sixpences; 12,796 farthings.
7. How many articles worth  $3\frac{3}{4}$ d. each can I buy for £20?
8. To how many persons can I give 3s. 6d. out of £91 7s.?
9. In 1728 sixpences how many guineas?
10. 25 francs are worth an English sovereign: what is the value in English money of 17,287 francs?
11. What is the difference between the number of farthings in five guineas and the number of pence in the same sum?
12. How many articles worth 3s. 4d. each can I buy for £79 10s.?
13. A prize fund of £500 is so distributed that one-fourth of it falls to the share of the officers, and the rest is given in sums of £2 10s. each to the seamen; how many seamen share it?
14. In 12,350 farthings how many sixpences? How many half-crowns?
15. If there were a coin worth  $2\frac{1}{2}$ d., how many could I obtain in change for £50?
16. If a million farthings were divided into 12 parts, of which one person received 7 and another 5, what would be the share of each?

## MISCELLANEOUS EXERCISES.—XLIII.

1. Find the price of 12 articles at  $3\frac{1}{2}$ d. each, and of five at  $7\frac{1}{2}$ d. each, and add them together.

2. Add together five half-crowns, seven shillings, nine sixpences, and fifteen pence.

3. If I have in my purse a £5 note, four sovereigns, seven half-sovereigns, a crown, five florins, seven shillings, three fourpenny pieces, and nine threepenny pieces, what sum have I in all?

4. What is the difference between 172 sixpences and 1720 pence?

5. Make out a bill for 4 pairs of shoes at 12s. 6d. each pair, 2 of boots at 19s. 6d. each, 3 pairs of slippers at 3s. 9d., and repairs amounting to 12s. 10d.

6. A man earns 27s. per week, his wife 30s. per calendar month, and three children 3s. 9d. per week each: what is the income of the whole family per annum?

7. When the income tax is at 5d. in the pound, what amount of tax does a gentleman pay whose income is £1250 per annum?

8. At a church offertory £28 10s. were collected, and it was calculated that on an average 4d. had been given by each person: how many were there in the congregation?

9. What is the difference between the number of farthings in £53, and the number in £24 7s. 6d.?

10. Out of an income of £800 per annum a man saves £12 every quarter: what does he spend per week?

11. Find the sum of three guineas and £6 14s.  $8\frac{1}{2}$ d., and reduce the whole to farthings.

12. If I pay for 56 yards of cloth at 2s.  $8\frac{1}{2}$ d. per yard, what sum will remain out of a £20 note?

13. Find the total cost of a score of articles at 3s. 9d. each, and of a gross at 5s. 2d. each.

14. If an equal number of men, women, and children receive each a gift, the men of 5s., the women of 2s. 6d., and the children of 1s. each, and if the whole sum distributed amounts to £65 0s. 6d., how many persons in all are relieved.



## WEIGHT.

**38.** The common table in use in England, for weighing all articles of ordinary sale, is as follows:—It is called *Avoirdupois* weight; other weights, such as Troy, and Apothecaries', being only used in special trades.

*The following should be learned by heart:—*

16 DRAMS make one OUNCE.

16 OUNCES make one POUND.

28 POUNDS make one QUARTER.

4 QUARTERS (OF 112 lbs.) make one HUNDREDWEIGHT.

20 HUNDREDWEIGHTS make one TON.\*

*Example I.* Multiply 7 cwt. 3 qrs. 13 lbs. 6 oz. by 5, or by 5 and 3.

cwt.	qrs.	lbs.	oz.
7	3	13	6
			5
1	19	1	10 14
			3
5	18	0	4 10

Five times 6 oz. are 30 oz. But because 16 oz. make 1 lb., 30 oz. = 1 lb. 14 oz. Set down 14 oz. and carry 1 lb.

Five times 13 lbs. are 65 lbs., which added to 1 lb. make 66 lbs. But as 28 lbs. = 1 qr., 66 lbs. are 2 qrs. and 10 lbs. Set down 10 lbs. and carry 2 qrs.

Five times 3 qrs. = 15 qrs., which with 2 makes 17 qrs. But since 4 qrs. = 1 cwt., 17 qrs. = 4 cwt. 1 qr. Set down the 1 qr. and carry 4 cwt.

Five times 7 cwt. are 35 cwt., which added to 4 make 39 cwt. But 39 cwt. equal 1 ton 19 cwt.

In like manner on multiplying 1 ton 19 cwt. 1 qr. 10 lbs. 14 oz. by 3, we find the answer to be 5 tons 18 cwt. 0 qr. 4 lbs. 10 oz.

\* The full tables of weight and measure, for purposes of reference, will be found on p. 70 of the "School Arithmetic," and an explanation showing the rise and history of our system of weighing on p. 332 of the "Science of Arithmetic."

*Example II.* Find the difference between one ton, and 17 cwt. 3 qrs. 12 lbs. 9 oz.

ton.	cwt.	qrs.	lbs.	oz.
1	0	0	0	0
	17	3	12	9
<hr style="border: 0.5px solid black;"/>				
	2	0	15	7
<hr style="border: 0.5px solid black;"/>				

Add 16 oz. to the upper line. 9 from 16 leaves 7 oz. Set down 7.

Add 4 lbs. to the lower line, and 28 lbs. to the upper. 13 from 28 leaves 15 lbs. Set down 15.

Add 1 qr. to the lower line, and 4 qrs. to the upper. 4 qrs. from 4 leaves nothing. Set down 0.

Add 1 cwt. to the lower line, and 20 cwt. to the upper. 18 cwt. from 20 leaves 2 cwt. Set down 2.

Add 1 ton to the lower line. 1 from 1 leaves 0.

The difference is 2 cwt. 15 lbs. 7 oz.

#### EXERCISE XLIV.

1. Add together 2 lbs. 6 oz., 14 oz., and 12 lbs.
2. Find the difference between the weight of one parcel of 5 lbs., and that of two weighing 1 lb. 9 oz. each.
3. What will three pounds of tea cost at  $3\frac{3}{4}$ d. per oz.?
4. Add together 7 cwt. 3 qrs., 2 tons 5 cwt., and 3 cwt. 1 qr. 19 lbs.
5. Find the total weight of five parcels, weighing respectively  $5\frac{1}{2}$  lbs., 2 lbs. 4 oz., 15 lbs., 3 lbs. 12 oz., and 29 oz.
6. Reduce 3 cwt. 2 qrs. 19 lbs. to pounds and ounces.
7. How many ounces are there in 3 qrs. 11 lbs.?
8. Reduce 1000 ounces to pounds.
9. How much butter at 10d. per lb. can I buy for £4 10s.?
10. How many parcels of sugar weighing 4 lbs. 4 oz. each can be made up out of a hogshead weighing 3 cwt. 2 qrs. 15 lbs.?
11. Find the price of 7 cwt. 3 qrs. 16 lbs. at five farthings per lb.
12. What is the difference between 1000 lbs. and 1000 ounces?

13. Find the price of 7 cwt. 3 qrs. of sugar at  $4\frac{1}{2}$ d. per lb.

14. How many three-ounce packets can be filled up from a box of lozenges weighing 3 qrs. of a hundred-weight?

tons.	cwt.	qrs.	lbs.	oz.	tons.	cwt.	qrs.	lbs.	oz.
15.	7	1	19	6	3	5	2	9	0
		3	18	5		8	1	15	11
	5	10	0	0		10	3	19	0
		3	1	4			1	20	7
						6	0	18	5

16. 7 tons 3 cwt. 18 lbs. + 19 lbs. 12 oz. + 3 qrs. 18 lbs. 7 oz. + 19 cwt. 19 lbs.

17. 2 cwt. 14 lbs. 7 oz. + 25 lbs. 11 oz. + 1 cwt. 1 qr. 1 lb. + 3 qrs. 12 lbs.

18. 5 tons 7 cwt. + 6 cwt. 1 qr. 23 lbs. — 17 cwt. 2 qrs. 18 lbs.

19. 18 cwt. 2 qrs. 9 lbs.  $\times$  6; 5 tons 3 cwt. 2 qrs. 9 lbs.  $\times$  11.

20. From four tons take thirty-nine cwt. three qrs. seventeen lbs.

21. How many parcels weighing  $2\frac{1}{4}$  lbs. each can be made up out of 17 cwt. 3 qrs.?

22. At  $8\frac{1}{2}$ d. per lb. what quantity can I buy for £79 6s. 8d.?

23. At £224 per ton what is the price of coffee per oz.?

24. Find how many times a pound and a half is contained in  $3\frac{1}{2}$  cwt.

25. What is the difference between 32 lbs. and 132 ounces?

26. Find the price of one hundred and thirty-seven lbs. at fourpence farthing per oz.

27. Reduce 11,100 oz. to hundredweights and tons.

28. Reduce  $5\frac{1}{2}$  tons to ounces and drams.

29. What is the difference in ounces between  $3\frac{1}{2}$  tons and  $39\frac{1}{2}$  cwt.

## LENGTH.

**39.** The measures of length in use in England are chiefly the Inch, Foot, Yard, and Mile. Other denominations are only occasionally used.

*To be learned by heart:—*

Twelve INCHES make one FOOT.

Three FEET make one YARD.

Five and a half YARDS make one POLE.

Forty POLES make one FURLONG.

Eight FURLONGS make one MILE.

It is also useful to remember that—

Two hundred and twenty YARDS make one FURLONG.\*

Seventeen hundred and sixty YARDS make one MILE.

*Example I.* Add together the lengths of 5 roads, of which the first is  $\frac{3}{4}$  of a mile long; the second 1 mile 3 furlongs; the third,  $2\frac{1}{2}$  miles; the fourth, 7 furlongs 20 poles; and the fifth, 1 mile 1 furlong 30 poles 4 yards.

miles.	furlongs.	poles.	yards.
	6	0	0
1	3	0	0
2	4	0	0
	7	20	0
1	1	30	4
<hr/>			
6	6	10	4
<hr/>			

There are only 4 yards in the right-hand column.

Set down 4 yards.

30 and 20 make 50 poles. But as 40 poles

make 1 furlong, 50 poles are 1 furlong 10 poles.

Set down 10 poles.

1 and 1 and 7 and 4 and 3 and 6 are 22 fur-

longs. But since 8 furlongs make 1 mile, 22 furlongs make 2 miles 6 furlongs. 2 and 1 and 2 and 1 make 6 miles. Set down 6 miles.

The answer is 6 miles 6 furlongs 10 poles 4 yards.

\* Unless poles are expressly mentioned in the sum, always use the number 220 as multiplier or divisor, and proceed at one step from furlongs to yards.  $5\frac{1}{2}$  is an inconvenient number; and "poles" are every day less and less used in practice as measures of length.

*Example II.* How many feet are there in  $7\frac{3}{4}$  miles?

miles.	furlongs.	
7	6	
8		
<hr style="width: 100%;"/>		
62	furlongs.	
220		
<hr style="width: 100%;"/>		
1240		
124		
<hr style="width: 100%;"/>		
13640	yards.	
3		
<hr style="width: 100%;"/>		
40920	feet.	
<hr style="width: 100%;"/>		

Since 8 furlongs are 1 mile,  $\frac{3}{4}$  of a mile equals 6 furlongs.  $8 \times 7 + 6 = 62$  furlongs, the number of furlongs in 7 miles 6 furlongs.

Since 220 yards make one furlong we multiply 62 by 220, and find that there are 13,640 yards in 62 furlongs, or in 7 miles 6 furlongs.

Since 3 feet make one yard, we multiply 13,640 yards by 3, and thus find that 40,920 feet = 13,640 yards = 62 furlongs = 7 miles 6 furlongs.

*Example III.* What will be the cost of a wall 2 miles and a half long, at 2s. 9d. per yard?

2)1760	
2½	
<hr style="width: 100%;"/>	
3520	= yards in 2 miles.
880	= „ half a mile.
<hr style="width: 100%;"/>	
4400	= „ 2½ miles.
33	
<hr style="width: 100%;"/>	
12)145200	= cost of the wall in pence.
<hr style="width: 100%;"/>	
20)12100	= „ shillings.
<hr style="width: 100%;"/>	
605	= „ pounds.
<hr style="width: 100%;"/>	

Since there are 1760 yards in a mile, there are 4400 yards in  $2\frac{1}{2}$  miles.

In 2s. 9d. there are 33 pence.

The whole cost must therefore be  $4400 \times 33$  pence.

And this product is (by **33**) equal to £605.

## EXERCISE XLV.

1. How many inches are there in 3 yards 2 feet ?
2. Reduce 7 furlongs to feet and inches.
3. In 100,000 feet how many miles ?
4. Add together 29 yards, 17 yards 8 inches, 15 yards 3 feet 4 inches, and 2 feet 11 inches.
5. What is the difference between 27 yards and 27 inches ?
6. How many lengths measuring 5 inches each can be cut off two balls of string, of which the one measures 178 yards and the other 256 feet ?
7. What is the cost of  $17\frac{1}{2}$  yards of gold thread at a halfpenny an inch ?
8. There are three roads, of which the first measures 1 mile 870 yards ; the second, 1260 yards ; and the third is as long as the other two put together. Express their united lengths in miles, furlongs, and yards.
9. Suppose it cost 6d. per foot to pave the three roads in the last sum : what will be the total cost of the paving ?
10. How many hurdles measuring 3 feet 4 inches each will be required to surround an oblong patch of ground, of which the two long sides measure 360 yards each, and the two short ones 270 yards 2 feet each ?
11. From a road two miles and a half long, two portions are paved measuring 1500 yards and 7 furlongs 120 yards respectively : what length remains unpaved ?
12. Find how many lengths of 3 feet 6 inches each can be cut off from a wire 1 mile 6 furlongs long.
13. If the telegraphic wire be supported by poles at intervals of 100 yards, how many such poles will there be along a railroad  $67\frac{1}{2}$  miles long ?
14. What will it cost to put up a fence on each side of a path three-quarters of a mile long at  $9\frac{1}{2}$ d. per foot.
15. How many times will a wheel which is 5 feet 6 inches in circumference revolve in a journey of  $7\frac{1}{2}$  miles ?

## SURFACE.

**40.** When square or oblong surfaces are measured, it is usual to multiply the length by the number representing the breadth. The reason of this will be seen from the diagram.



If A B were three feet long, and B C 2 feet long, the whole space would be divided into six spaces ( $3 \times 2$ ), each being one foot square. The units of surface chosen for measurement are always *squares*

formed upon the units of length.

*To be learned by heart :—*

144 SQUARE INCHES make one SQUARE FOOT.

Nine SQUARE FEET make one SQUARE YARD.

*Example I.* How many square yards of carpet will be required to cover a floor measuring 18 feet long and 15 feet wide ?

$$18 \times 15 = 270 \text{ square feet.}$$

But because 9 square feet make 1 square yard,

$$270 \div 9 = 30 \text{ square yards.}$$

*Example II.* How many yards of paper  $\frac{1}{2}$  a yard wide will be required to cover the walls of a room 12 feet high, which measures 21 feet by 18 feet? and what will it cost at  $7\frac{1}{2}$ d. per yard?

There are four walls in the room.

The dimensions of each of the longer walls are 21 feet by 12, or  $21 \times 12 = 252$  square feet.

The dimensions of each of the shorter walls are 18 feet by 12, or  $18 \times 12 = 216$  square feet.

The total dimensions of the four walls therefore are  $252 + 252 + 216 + 216 = 936$  square feet.

But  $936$  square feet  $= 936 \div 9 = 104$  square yards.

And if the paper is half a yard wide, twice this number of yards will be required, or  $104 \times 2$  or  $208$  yards of paper.

But  $208 \times 7\frac{1}{2}$ d.  $= 1560$ d.  $= \text{£}6$  10s., which is the cost of papering the room.

## EXERCISE XLVI.\*

1. How many square feet are there in the floor of a room 9 yards long and 4 yards wide?
2. Find the dimensions of the ceiling, and of each of the four walls of a room 65 feet long, 34 feet broad, and 16 feet high.
3. How many square inches are there in a sheet of paper 1 foot 3 inches long and 7 inches broad?
4. If floorcloth costs 4d. per square foot, what will it cost to cover a passage fifteen yards long and 7 feet wide?
5. If 8 square feet of space be allowed for each child in a schoolroom, how many children can be accommodated in a room 90 feet long and 40 broad?
6. How much space will be enclosed if 40 hurdles measuring 3 feet long are arranged so as to include an oblong space, 14 hurdles being on each of the longer, and 6 on each of the shorter sides?
7. A man buys a plot of building ground at 1s. 3d. per square foot; the frontage is 27 yards, and the depth 13 yards: what does he pay for the land?
8. How many square inches are contained in a floor 14 feet long and 9 feet wide?
9. What will be the cost of laying down encaustic tiles along a gallery measuring 35 feet long and 16 feet broad, at the rate of 1 penny per square inch.
10. What will it cost to paper a room 28 feet long, by 18 broad, and 13 feet high, if the paper is two feet wide, at 10d. per yard?
11. How many spaces containing 20 square feet each are equal in area to a space measuring 60 yards by 18?
12. How many paving-stones, measuring 3 feet by 2, will be required for a footpath half a mile long and 18 feet broad, and what will it cost to lay it down at 3d. per square foot.

\* Throughout this exercise no questions involving fractions or the technical use of duodecimals are used. For a full explanation and advanced exercises in this rule, see "School Arithmetic," p. 58, and "Science of Arithmetic," p. 275.



## SURFACE—(continued).

41. When large surfaces, such as fields, gardens, and roads are measured, the following table is used :—

*To be learned by heart :—*

Thirty and a quarter ( $30\frac{1}{4}$ ) SQUARE YARDS make one PERCH.

Forty (40) PERCHES make one ROOD.

Four (4) ROODS make one ACRE.

Six hundred and forty (640) ACRES make one SQUARE MILE.

*Example I.* How many square feet are there in 17 acres 3 roods ?

$$\begin{array}{r}
 17 \text{ acres } 3 \text{ roods.} \\
 4 \\
 \hline
 71 \text{ roods in } 17 \text{ acres } 3 \text{ roods.} \\
 40 \\
 \hline
 2840 \text{ perches in } 17 \text{ acres } 3 \text{ roods.} \\
 30\frac{1}{4} \\
 \hline
 85200 = 30 \text{ times } 2840. \\
 710 = \text{a quarter of } 2840. \\
 \hline
 85910 = 30 \text{ and a quarter times } 2840. \\
 9 \\
 \hline
 773190 = \text{number of square feet in } 17 \text{ acres } 3 \text{ roods.} \\
 \hline
 \hline
 \end{array}$$

We multiply the acres by 4, and add in the 3 roods.

There are 71 roods in 17 acres 3 roods.

We multiply 71 by 40 because 40 perches make 1 rood.

There are 2840 perches in 17 acres 3 roods.

We multiply 2840 by  $30\frac{1}{4}$  because  $30\frac{1}{4}$  square yards make 1 perch.

We multiply 85910, the number of square yards in 17 acres 3 roods by 9 in order to reduce to square feet.

The answer is 773190, the number of square feet in 17 acres 3 roods.

*Example II.* What are the dimensions of three fields, measuring respectively 29 acres 3 roods 27 poles; 15 acres 2 roods 18 poles; and 31 acres 3 roods 39 poles.

acres. roods. perches.

29      3      27

15      2      18

31      3      39

---

77      2      4

---

On adding 39, 18, and 27 together, we find they make 84.

But because 40 perches make 1 rood, 84 perches = 2 roods 4 perches. Set down 4 perches and carry 2 roods.

2 and 3 and 2 and 3 make 10 roods.

But because 4 roods make 1 acre, 10 roods make 2 acres 2 roods. Set down 2 roods and carry 2 acres.

2 and 31 and 15 and 29 make 77.

The answer is 77 acres 2 roods 4 perches.

### EXERCISE XLVII.

1. Find the difference in size between a field measuring 100 acres, and one measuring 79 acres 2 roods 18 perches.

2. What is the total area covered by five garden plots measuring 1 rood 19 perches each?

3. How much should I give for a square mile of waste ground at £3 10s. per acre?

4. How many plots of land measuring 11 yards square\* can be taken out of 15 acres?

5. If a plot of ground measures one mile long and a quarter of a mile broad, how many acres does it contain?

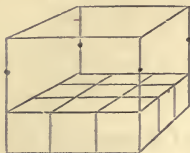
6. A man buys a piece of land for a house, measuring 15 yards in frontage and 14 yards in depth, at 2s. 6d. per square foot: what does the land cost?

7. Find the rent of five fields, measuring respectively 17 acres 2 roods; 14 acres 20 perches;  $7\frac{1}{2}$  acres; 12 acres 8 poles; and 19 acres 2 roods 12 poles; at 15 shillings an acre.

\* Observe the difference between 11 square yards and 11 yards square. The first means 11 spaces measuring 1 square yard each; the second means one square space having 11 yards as the length of its side, or  $11 \times 11$ , or 121 square yards.

## CAPACITY OR BULK.

**42.** When a solid mass has to be measured, its length, breadth, and thickness have to be separately calculated.



If a cube measures three inches each way, it would, if cut into pieces of one inch each way, be found to contain *three times three times three* such pieces, or twenty-seven cubic inches; *i. e.*, nine in each of three layers, as shown in the diagram. For this reason twenty-

seven is often called the cube of three.

And  $10 \times 10 \times 10$ , or 1000, is the cube of 10.

Hence, to find the cubic units in any solid mass we measure the length by the breadth and by the height.

*To be learned by heart :—*

1728 CUBIC INCHES ( $12 \times 12 \times 12$ ) make one CUBIC FOOT.

27 cubic feet (or  $3 \times 3 \times 3$ ) make one CUBIC YARD.

*Example.* How many cubic inches are there in a block of stone measuring 14 feet long, 7 feet wide, and 10 feet deep?

$14 \times 7 \times 10 = 980 =$  the number of cubic feet in the block of stone. Therefore  $1728 \times 980 = 1,693,440$  or the number of cubic inches in the block.

## EXERCISE XLVIII.

1. How many cubic feet of air are contained in a room measuring 21 feet long, 18 feet wide, and 11 feet high?

2. How many bricks containing 108 cubic inches each can be cut out of a mass of clay measuring 20 feet long, 16 wide, and 8 deep?

3. A reservoir of water is 36 feet long, 30 feet wide, and 5 feet deep: how many cubic feet does it contain?

4. What will a block of marble cost which measures 1 foot and a half long, 7 inches wide, and 11 inches deep at  $1\frac{1}{2}$ d. per cubic inch?

## CAPACITY OR BULK—(continued).

**43.** When the bulk of liquids, of seeds or of corn, has to be measured it is more convenient to employ the names of vessels which are in common use.

*To be learned by heart :—*

Two pints make one QUART.

Four quarts make one GALLON.

Two gallons make one PECK.

Four pecks make one BUSHEL.

Eight bushels make one QUARTER (of corn).

*Example.* What will  $17\frac{1}{2}$  gallons of wine cost at 3s. 6d. per pint?

17 gallons 2 quarts.

4

—

70 quarts in  $17\frac{1}{2}$  gallons.

2

—

140 pints in  $17\frac{1}{2}$  gallons.

42

—

12)5880

20) 49.0

24.10

5880 pence = £24 10s.

Reduce the gallons to pints.

There are 140 pints in

$17\frac{1}{2}$  gallons.

Because 3s. 6d. equal 42 pence,

Therefore  $140 \times 42 =$

5880 pence = price of  $17\frac{1}{2}$  gallons in pence.

## EXERCISE XLIX.

1. Add together 3 pints, 13 quarts, and 12 gallons.
2. How many pints are contained in 17 quarters of wheat?
3. How many bottles containing a pint and a half can be filled from 3 casks containing  $4\frac{1}{2}$  gallons, 6 gallons, and 8 gallons respectively?
4. Find the difference between the contents of a vessel of 28 gallons 1 peck, and one of 19 gallons 3 quarts.
5. What will be the total capacity of 15 casks containing 5 gallons 3 quarts 1 pint each?
6. In  $23\frac{1}{2}$  bushels how many pints?
7. Reduce 10,000 half-pints to gallons.
8. Divide 17 quarters 7 bushels 3 pecks by seven.

## EXERCISE XXXVII.

1. Multiply £3 10s. 4d. by thirteen.
  2. Multiply £26 15s. 3½d. by seventeen.
  3. Multiply £54 15s. 8¼d. by nineteen.
  4. Add together five times £2 3s. 6d., and twenty-three times 17s. 9d.
  5. What will 47 pairs of boots cost at £1 1s. 6d. per pair?
  6. Find the price of three dozen articles at £2 15s. 9d. each.
  7. What will 59 acres of land cost at £22 10s. per acre?
  8. Multiply £37 15s. 6d. by 73, and subtract £1250 6s. 4d. from the product.
  9. £28 13s. 6d. × 19;                      £12 14s. 7½d. × 23.
  10. £220 10s. 4½d. × 41;                £153 16s. 8¼d. × 26.
  11. £274 10s. 2d. × 30;                £832 15s. 2¼d. × 23.
  12. £1 16s. 5¾d. × 37;                £1862 12s. 4½d. × 53.
  13. £216 10s. 10¼d. × 17;            £10 12s. 3½d. × 29.
  14. £107 3s. 11¼d. × 53;            £617 2s. 9d. × 46.
- 
- |   |   |
|---|---|
| 15.        £    s.   d.<br>683   5   2<br>31<br><hr style="border: 0.5px solid black;"/> <hr style="border: 0.5px solid black;"/> | £    s.   d.<br>7294 10   4½<br>19<br><hr style="border: 0.5px solid black;"/> <hr style="border: 0.5px solid black;"/> |
|---|---|
- 
16. Find the total cost of twenty-three articles at £1 9s. 6d. each, and of thirty-five articles at 17s. 8½d. each.
  17. What is the value of 24 casks of wine, each worth £15 4s. 7d.?
  18. Deduct fifteen times £23 4s. 6d. from £1000.
  19. If a draper buys seventy-five shawls at £3 17s. 6d. each, and sells them at four guineas and a half each, what profit does he gain?
  20. What is the cost of 19 tons of iron at £9 9s. 6d. per ton?

## HOUSEHOLD ACCOUNTS AND SIMPLE BILLS.


**32.** The most frequent use to which easy Multiplication and Addition of money are put is the calculation of small accounts after making purchases at shops.

*Example I.* If I buy at a stationer's six quires of note-paper at  $4\frac{1}{2}$ d., three packets of envelopes at 8d. each, some drawing-paper for 1s. 3d., five black-lead pencils at  $3\frac{1}{2}$ d., two boxes of steel pens at 1s. 6d. each, and an inkstand for 4s. 6d., how much do I spend?

It is usual to arrange such an account thus:—

		s.	d.
6 quires of note-paper at $4\frac{1}{2}$ d. ...	2	3	
3 packets of envelopes at 8d. ...	2	0	
Drawing-paper ... ..	1	3	
5 pencils at $3\frac{1}{2}$ d. ... ..	1	$5\frac{1}{2}$	
2 boxes steel pens at 1s. 6d. ...	3	0	
Inkstand .... ..	4	6	
		14	$5\frac{1}{2}$
		14	$5\frac{1}{2}$

## EXERCISE XXXVIII.

 Compute and finish the following accounts:—

		s.	d.
1. 5 lbs. of rice at $3\frac{1}{2}$ d. per lb. ...			
6 lbs. of soap at 5d. ... ..			
8 lbs. of Valencia raisins at $6\frac{1}{2}$ d. ...			
3 packets of starch at $5\frac{3}{4}$ d....			
6 tablets of soap at 3d. ... ..			
5 quires of paper at 7d. ... ..			
2 quires of foolscap at $9\frac{1}{2}$ d. ...			
8 packets of envelopes at 4d. ...			
4 magazines at 9d. ... ..			
7 prayer-books at 2s. 3d. ... ..			

		s.	d.
2.	4 lbs. of tea at 3s. 6d.	...	
	5 lbs. of coffee at 1s. 8d.	...	
	7 lbs. of loaf sugar at 6½d.	...	
	6 lbs. of moist sugar at 4½d.	...	
	3 pairs of gloves at 3s. 9d.	...	
	2 neckties at 1s. 6d.	...	
	4 pairs of stockings at 2s. 2d.	...	
	3 silk handkerchiefs at 3s. 6d.	...	

---

3. 13 yards longcloth at 3¾d., 25 yards shirting at 8½d., 2 dozen napkins at 1s. 4d. each, 3 tablecovers at 8s. od. each.

4. 19 yards black silk at 5s. 2d. per yard, 5 yards crape at 6s. 6d., 12 yards black alpaca at 1s. 7d., and 3 pairs kid gloves at 2s. 8d.

5. 2 bottles of pickle at 10½d., 3 of fruit at 9d., 1 bottle of blacking at 1s. 2d., 9 lbs. of candles at 6½d. per lb.

6. 5 pairs cotton hose at 1s. 9d., 6 pairs worsted at 2s. 3½d., 4 pairs merino at 3s. 2d. per pair, and 2 dozen children's socks at 7½d. per pair.

7. 27½ yards of carpet at 4s. 9d. per yard, 27½ of felt at 9½d., making the same 27½ yards at 4d. per yard; stair carpet, 27 yards at 3s. 9d.; two dozen stair rods at 2½d. each.

8. Two dozen port at 48s. per dozen, 2 dozen pale sherry at 46s., 3 dozen Sauterne at 24s., 4 dozen pints of claret at 13s.

9. 3 pairs lace curtains at 23s. 9d. per pair; tapes, rings, &c., for the same, 6s. 6d.; making up and fixing same, 18s. 6d. 18 yards grey silk at 6s. 9d.; 14 yards of muslin at 8½d.

10. Making and fixing 3 window-blinds for drawing-room (2 at 18s. 4d. each, 1 at 12s. 10d.); 7 blinds for bedrooms (viz., 2 at 11s. 8d. each, 1 at 7s. 6d., and 4 at 6s. 2d. each); rods, screws, lines, &c., for fixing, 6s. 6d. Altering spring rollers, 4s. 6d., cleaning and repairing outside blinds, £1 3s.

## SIMPLE REDUCTION, AND OTHER USES OF MULTIPLICATION.

**33.** *Example I.* How many pence are there in £23?  
 £23 . Because there are 20 shillings in £1:  
 20  
 ———  
 460 = shillings in £23. 23 shillings, or 460 shillings.  
 12 And because there are 12 pence in a shilling, there are  
 ——— in 460 shillings 12 times 460,  
 5520 = pence in £23. or 5520 pence.  
 Hence there are 5520 pence in £23.

*Example II.* Reduce £59 16s. 2¼d. to farthings.  
 £59 16s. 2¼d. We multiply £59 by 20, and add in the 16 shillings.  
 20 There are thus 1196 shillings in  
 ——— £59 16s.  
 1196 = shillings in £59 16s. There are thus 1196 shillings in  
 12 We multiply 1196 by 12, and add in the 2 pence.  
 ——— 14354 = pence in £59 16s. 2d. There are thus  
 4 57417 farthings in £59 16s. 2¼d.  
 ———

We multiply 14354 by 4, and add in the 1 farthing.  
 There are thus 57417 farthings in £59 16s. 2¼d.

*Example III.* How many fourpenny pieces are there in £139 15s.?  
 £ s. d. We multiply £139 by 20, and add in the 15 shillings. There are 2795 shillings in £139 15s.  
 139 15 0  
 20  
 ———  
 2795 But there are three fourpenny pieces in a shilling. Therefore we multiply 2795 shillings by 3.  
 3  
 ———  
 8385 There are thus 8385 fourpenny pieces in £139 15s.  
 ———



## EXERCISE XXXIX.

1. Reduce £1769 to shillings; £18 10s. to pence.
2. How many sixpences are there in £1385 5s.?
3. If there were a coin worth two pence, how many could I have in change for two guineas?
4. Reduce £3 19s. 6 $\frac{3}{4}$ d. to farthings.
5. Find the price of 17 articles at 2 $\frac{1}{2}$ d. each.
6. How many things worth three halfpence each can I buy for 5s.?
7. Find the difference between the number of four-penny pieces and the number of threepenny pieces in £2 15s.
8. In seventeen half-crowns how many pence?
9. If I changed a five-pound note into threepenny pieces, how many should I have?
10. How many more shillings are there than half-crowns in twenty guineas?
11. Reduce the two sums £12 16s 3 $\frac{1}{2}$ d. and £24 7s. 9d. to farthings.
12. Find the difference in pence between £36 14s. 8d. and £50.
13. Divide £175 16s. 9d. by 3, and give the answer in farthings.
14. How many halfpence are equal in value to twelve bags of money containing £1 16s. 3d. each?
15. Multiply £763 18s. 4d. by 15, and reduce the answer to pence.
16. How many halfpence are there in seventeen guineas?
17. How many farthings are there in seven times £18 6s. 4 $\frac{1}{4}$ d?
18. Find the total number of farthings in nine guineas, three half-sovereigns, and fifteen half-crowns and seven sixpences.
19. How many articles worth three halfpence each could I buy for £57 10s.?
20. Add the number of farthings in seven hundred and fifty pounds to the number of shillings in the same sum.

## DIVISION OF MONEY.

**34.** In dividing a sum of money, pounds, shillings, pence, and farthings must be separately divided in succession, and when there is any remainder, it must be reduced to the term next below it.

*Example I.* Divide £33 6s. 3d. by three.

£	s.	d.	We find one-third of £33 by the
3)33	6	3	method of simple division, <b>16.</b>
			The answer is £11.
11	2	1	A third of 6s. is 2s.
			The third of 3d. is 1 penny.

The answer is £11 2s. 3d.:

*Example II.* Divide £164 11s. 4½d. by 7.

£	s.	d.	We divide 164 by
7)164	11	4½	7, and find the quo-
			tient to be £23 with
23	10	2¼	a remainder, £3.
			: ¾ remainder.

Now £3 and 11s. reduced to shillings make 71 shillings.

The seventh of 71 is 10, with a remainder of 1 shilling.

One shilling and fourpence make 16 pence.

The seventh of 16 is 2, with a remainder of 2 pence.

2 pence and ½d. reduced to farthings make 10 farthings.

The seventh of 10 is 1, with 3 farthings remainder.

The nearest answer therefore is £23 10s. 2¼d., with three farthings remaining undivided.

## EXERCISE XL.

1. What is the fourth part of £1 10s.?
2. Divide £26 by five.
3. Add the half of £10 10s. to the third part of the same sum.
4. If £250 10s. are left to be divided among 6 persons, how much will each receive?
5. £18 have to be divided among 10 persons: how much will each receive?

6. From the half of five guineas take the third of five guineas.

$$7. \quad \begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 8)7 \quad 2 \quad 6 \\ \hline \end{array}$$

$$7)23 \quad 10 \quad 4 \\ \hline$$

$$8. \quad \begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 10)123 \quad 16 \quad 8 \\ \hline \end{array}$$

$$11)25 \quad 2 \quad 9 \\ \hline$$

9. £18 12s. 6d. ÷ 10;      £24 5s. 7d. ÷ 7.

10. £38 17s. 3d. ÷ 11;      £19 6s. 5d. ÷ 12.

11. £37 15s. 3d. ÷ 5;      £184 10s. ÷ 8.

12. £207 15s. 6d. ÷ 6;      £327 14s. 8d. ÷ 9.

13. Add together the eighth and the tenth parts of £53 12s. 6d.

14. Take the twelfth part of £126 3s. from the whole of that sum.

15. A gentleman bequeaths £1250, of which one-half is given to his eldest son, one-third to his second son, and the remainder in charities; how much money is given to each purpose?

16.  $\frac{\text{£}213 \quad 17\text{s.} \quad 6\text{d.} + \text{£}519 \quad 12\text{s.} \quad 8\text{d.}}{12}$

17.  $\frac{\text{£}504 \quad 10\text{s.} - \text{£}196 \quad 13\text{s.} \quad 4\text{d.}}{8}$

18.  $\frac{\text{£}27 \quad 15\text{s.} \quad 6\frac{1}{2}\text{d.} + \text{£}196 \quad 18\text{s.} \quad 7\text{d.} - \text{£}59 \quad 10\text{s.} \quad 4\frac{1}{4}\text{d.}}{7 + 4}$

19.  $\frac{\text{£}325 \quad 16\text{s.} \quad 7\text{d.} \times 10}{7}$

20. Find the difference between the eighth and the twelfth parts of £1250.

21. If the sum of £1827 19s. 6d. be divided into nine parts, of which A receives five, and B four, what is the share of each?

22. Divide a legacy of £8757 2s. among three persons, so that the first shall have five parts, the second four parts, and the third two parts.

DIVISION OF MONEY (*continued*).

**35.** When the divisor is greater than 12, each remainder must be set down separately, and the work done as in Long Division (**22**).

*Example.* Divide £7135 16s. 4d. by 27.

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \quad \text{£} \\ 27 \overline{) 7135 \quad 16 \quad 4} \quad (264 \\ \underline{54} \end{array}$$

$$\begin{array}{r} 173 \\ 162 \\ \hline \end{array}$$

$$\begin{array}{r} 115 \\ 108 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ 20 \\ \hline \end{array}$$

27)156(5 shillings.

$$\begin{array}{r} 135 \\ \hline \end{array}$$

$$\begin{array}{r} 21 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ \hline \end{array}$$

27)256(9 pence.

$$\begin{array}{r} 243 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \hline \end{array}$$

27)52(1 farthing.

$$\begin{array}{r} 27 \\ \hline \end{array}$$

25 farthings remain undivided.

We first divide £7135 by 27, as in **22**.

The quotient is £264, and £7 are left undivided.

We next reduce these £7 and the 16s. to shillings. They make 156 shillings.

On dividing 156 by 27, the nearest answer is 5s., and 21 shillings remain undivided.

We next reduce these 21 shillings and 4d. to pence. They make 256 pence.

On dividing 256 by 27 we find the quotient to be 9 pence, and 13 pence remain undivided.

We next reduce the 13 pence to 52 farthings.

On dividing these 52 by 27 we find the quotient 1, and a remainder of 25 farthings which cannot be divided by 27.

The answer is, therefore, £264 5s. 9¼d., and 25 remainder.

3. To how many persons can I give  $5\frac{3}{4}$ d. out of £460?
4. How many lengths of  $8\frac{2}{3}$  inches can be cut from a piece 172 yards long?
5. There are  $30\frac{1}{4}$  square yards in a perch: how many perches are there in 5289 yards?
6.  $32067 \div 6\frac{3}{5}$ ;  $5183 \div 11\frac{1}{7}$ .
7.  $41682 \div 15\frac{2}{7}$ ;  $31625 \div 8\frac{3}{4}$ .
8.  $2196 + 578$ ;  $516382 - 29547$ .

$15\frac{2}{3}$

$172\frac{2}{3}$

9. Find the total number of shillings in 28 half-crowns, twelve half-sovereigns, and 17 £5 notes.
10. What is the worth of a 17 lb. bag of tea at  $3\frac{1}{4}$ d. per oz.?
11. How many persons can receive  $4\frac{1}{2}$ d. each out of a sum of £12 18s.?
12. Multiply the product of 712 and 518 by the difference between these numbers.
13. Add together 45 pence, 45 farthings, and 45 shillings.
14. Take seventeen thousand four hundred and nineteen pounds fourteen shillings and fourpence three farthings from a million pounds.
15. How many halfpence are there in fifteen guineas?
16. How many packages weighing  $2\frac{3}{4}$  oz. each can be made up out of two chests of tea weighing 1 cwt. 3 qrs. 17 lbs. each?
17. Add together  $\frac{5}{8}$  of 1s.,  $\frac{7}{12}$  of £1,  $\frac{3}{5}$  of a crown, and  $\frac{4}{15}$  of £5.
18. What would it cost to put up a fence a mile and three-quarters long at 1s.  $7\frac{1}{2}$ d. per yard?
19. If I draw off from a vessel successively a third, a fourth, and a sixth of its contents, what portion of the whole remains?
20. How many yards of velvet trimming  $\frac{1}{8}$  of a yard wide can be cut from a piece  $31\frac{1}{2}$  yards long and  $\frac{3}{4}$  of a yard wide?
21. How often does a clock which chimes every quarter of an hour chime in 17 weeks 3 days?

## ANSWERS TO EXERCISES.

VII.—(1) 12. (2) 8. (3) 17. (4) 14. 4. (7) 8.  
(8) 13. (9) 15. (10) 8. (11) 8. 7. 8. (12) 14. (13) 7.

VIII.—(1) 11. 12. 16. 11. 13. 10. 12. 13.  
(2) 7. 9. 5. 5. 5. 8. 9. 7. 7.

IX.—(1) 37. 81. 92. 91. 54. 75. 75. 50.  
(2) 24. 33. 51. 59. 54. 24. 33. 21. 16.

X.—8. 4. 19. 47. 67. 68. 34. 5. 5. (1) 4.  
36. 38. (2) 43. (3) 15 pence. (4) 32. (5) 76.  
(6) 23. (7) 21. (8) 12. (9) 27. (10) 17. (11) 34.

XI.—(1) 94. 86. 53. (2) 87. 99. 95. (3) 57.  
(4) 98. (5) 84. (6) 92. (7) 95 yards. (8) 56.  
(9) £11. (10) 29.

XII.—(1) 884. 550. 931. (2) 867. 870. 450.  
(3) 166. (4) £804. (5) 96. (6) 270. (7) 115. (8)  
49. (9) 102. (10) 46. (11) 775.

XIV.—959. (2) 35. 286. (3) 161. (4) 22. (5)  
187. (6) 124. (7) 31. (8) 313. (9) £175. (10)  
156. (11) £39. (12) £39. (13) 174. (14) 295.  
186. 713. (15) 339. 376. (16) 134. 197. 268.  
(17) 482. 167. 487. (18) 257. (19) 665. (20) 119.  
(21) 484. (22) 169.

XVI.—(1) 750. (2) 3561. (3) 4322. (4) £1392.  
£1097. (5) 326 miles. (6) £387. (7) 58. (8) B.  
over C 51. B over A 834. C over A 783. (9) 5870.  
10,034. 4957. (10) 6240. 6044. (11) 1086. 831.  
4375. (12) 2859. 1456.

XVII.—(1) 12. (2) 15. (3) 16. 24. (4) 24. (5)  
6. 8. 9. 10. (6) 4. 5. 3. 2. (7) 6. 4. (8) 5.  
(9) 7. (10) 4. 6. (11) 3. (12) 2. 3.

XVIII.—(1) 36. 75. (2) 92. 114. (3) 318. (4).  
906. (5) 735. (6) 507. (7) 79. (8) 187. (9) 34.  
1587. 246. 4218. (10) 1436. 1254. 1578.

XIX.—(1) 28. 30. 28. (2) 15. 32. 10. 12. (3)  
20. 25. 45. (4) 36. 28. 12. 24. (5) 20. 36.  
16. (6) 18. 24. 30. 12. (7) 4. 4. 7. 2. (8) 5.

4. (9) 32. (10) 48. (11) 60. (12) 55. 33. 44.  
 (13) 5136. 10,196. 28,484. (14) 20,240. 6355.  
 (15) 32,484. 3126. 35,480. (16) 24,508. 24,579.  
 (17) 606. 5135. 12,648. (18) 9820. 2876.

XX.—(1) 56. 18. 36. (2) 35. 63. (3) 72. 35. (4)  
 6. 8. 9. (5) 6. 10. 5. 3. (6) 6. 4. 3. 2. 12.  
 (7) 28. 40. (8) 63. (9) 4. 12. 2. 24. 3. 16.  
 8. 6.

XXI.—(1) 2065. 2478. (2) 10,450. (3) 156. 324.  
 567. 2076. (4) 136. 312. 1736. (5) 114. 674.  
 (6) 168. 708. 7500. (7) 711 pounds. (8) 239. (9)  
 623. (10) 116. 2152. 2856. (11) £14,538. (12)  
 The latter by 31. (13) 7808. (14) 1404. (15) 3640.  
 67,529. 3336. (16) 7360. 5778. 62,998. (17) 9582.  
 103,500. 15,183. (18) 49,626. 28,728. 12,168. (19)  
 33,304. 10,980. 35,889. (20) 16,335. 24,822. 16,136.  
 (21). 8274. 56,980. 74,136. (22) 36,141. 72,369  
 62,064.

XXIII.—(1) 170. 280. 3100. (2) 2160. 21,600.  
 216,000. (3) 195,200. (4) 1,245,600. (5) 76,700.  
 (6) 326,480. (7) 32,500.

XXIV.—(1) 1206. (2) 11,310. (3) 1850. (4)  
 64,625. (5) 923,601. (6) 8820. (7) 1904. 35,280.  
 (8) 308. 812. (9) 3540. (10) 2560. 43,260. (11)  
 58,473. (12) 557. (13) 13,232. 19,776. (14) 546,936.  
 98,268. (15) 900,798. 624,085. (16) 660,969. 22,790.  
 (17) 2,195,095. 437,525. (18) 643,282. 821,016. (19)  
 15,310,600. 6,621,534.

XXV.—(1) 17,496. 311,148. (2) 819. (3) 67,284.  
 495,648. (4) 1128. 7632. (5) 612. 3888. 3384.  
 (6) 83,020. 1,373,247. (7) 383,760. 1,580,040. (8)  
 2,535,162. 93,984. (9) 55,530. 5,126,247. (10)  
 778,185. 159,350. (11) 2,302,016. 1,229,984. (12)  
 3,064,320. 3,342,800. (13) 391,068. 33,477,138.  
 (14) 14,784. (15) 60,903. (16) 62,720.

XXVI.—(1) 21,182. 53. (2) £40. £20. (3)  
 412. (4) 42. 132. 266. (5) 125. (6) 305. (7)  
 150. 200. 120. 300. (8) £2,434. (9) 209. (10)

21,130. (11) 21,423. (12) 1193. (13) 84,011-3.  
 9805-3. (14) 4526-3. 7198-6. (15) 3997-5. 725,460-1.  
 (16) 89,962-3. 5332-3. (17) 3962-2. 4802-5. (18)  
 8134-3. 68,474-3.

XXVII.—(1) 40. (2) 52-20. (3) 81. (4) 42,533-9.  
 (5) 336. (6) 31. (7) 1980. (8) 178. (9) 15 and  
 55 remainder. (10) 7. (11) 20. (12) 157-108. (13)  
 453-15. 3478-3. 1267-15. (14) 492-194. 627-58.  
 2976-9. (15) 285,448-2529. 2415-164. 4807-10.  
 (16) 880-372. 5891-76. 2599-205. (17) 1345-3.  
 761-25. 4010-16. (18) 34,346-20. (19) 394.

XXVIII.—(1) 32-79. (2) 392-185. (3) 176,938-2;  
 17,693-82; 1769-382; 176-9382. (4) 17-69; 383-51;  
 526-84; 4793-82. (5) 10; 1000; 100. (6) 7-59.  
 (7) 59, with 763 remaining. (8) 204-143. (9) 1383-  
 16; 13-23,256. (10) 383-365. (11) £54; £118 10  
 shillings. (12) £122 and 40 fourpences; £682 and  
 40 fourpences. (13) 17-136. (14) 276. (15) 568-320.  
 (16) 811-222; 64-4665. (17) 61-4870; 86-29,175.  
 (18) 17-14,438; 1774-248. (19) 1265-187; 58-676.  
 (20) 175,990. (21) 1173-614.

XXIX.—(1) 39. (2) 30. (3) 80; 2. (4) 5; 16.  
 (5) 20. (6) 160. (7) 442. (8) 262. (9) 160. (10)  
 4. (11) 13; 73-246. (12) 31,860; 630. (13) 268.  
 (14) 69,592. (15) 149,076.

XXX.—(1) 4064 grs. (2) 1867. (3) 66 yrs. (4)  
 884 shillings. (5) 900; 21,600. (6) 45 yds. (7) 35.  
 (8) 1232. (9) 608. (10) 132. (11) £12,280. (12)  
 £200. (13) 139-668. (14) 313. (15) 28,830. (16)  
 332. (17) 1568; 1848. (18) 22,222-2. (19) 47,520;  
 31,680. (20) 25,908. (21) 384. (22) 1279. (23)  
 3,652,264. (24) 273. (25) 45,904. (26) 10,000.  
 (27) 541,985; 660,372. (28) 157,030. (29) 6878.  
 (30) 7168. (31) 41,879. (32) 22,704,108. (33)  
 50,000.

XXXII.—(1) 8-18. (2) 15 pence. (3) 2½d. (4)  
 5d. (5) 3d.; 1s. 3d. (6) 2s. 7d. (7) 8½d. (8) 1½d.  
 (9) 15. (10) 2d. (11) 6d. (12) 15.



XXXIII.—(1) £2 14s. 7d. (2) £33 19s. 10d.  
 (3) £2 8s. 7d. (4) £52 7s. 5d. (5) £50 9s. 1d.;  
 £381 os. 3d.; £382 17s. 8d. (6) £12 5s. 3d.;  
 £291 3s. 3d.; £28 6s. 1¼d. (7) 11s. 3½d. (8)  
 £1 8s. 7½d. (9) 10s. 3d. (10) £9 12s. 4d. (11)  
 £22 5s.

XXXIV.—(1) £6327 18s. 1½d. (2) £3612 1s. 5¼d.  
 (3) £12,317 8s. 4½d. (4) £5199 16s. 8¼d. (5)  
 £8189 8s. 11¼d. (6) £4017 15s. 2d. (7) £22  
 10s. 11d. (8) £681 18s. 7d. (9) £52 14s. 2d.  
 (10) £2664 11s. 8¾d.; £4367 1s. 10d.; £5744  
 15s. 5¼d. (11) £28,923 os. 10½d.; £57,515 12s. 8½d.;  
 £29,148 15s. 8½d. (12) £2 1s. 8¾d. (13) £35,581  
 11s. 11¾d.; £20,582 14s. 6d.; £37,513 15s. 9d.

XXXV.—(1) 3s. 8d. (2) £123 6s. 6d. (3) £5  
 16s. 4d. (4) £18 5s. 3d. (5) £518 10s. (6)  
 £2386 6s. 10½d.; £1322 6s. 8½d.; £78 os. 10d.  
 (7) £2795 4s. 4¾d.; £14,888 5s. 9½d.; £2712  
 6s. 5½d. (8) £978 9s. 5½d. (9) £197 14s. 8d. (10)  
 £186 10s. 0½d. (11) £2 19s. 7½d. (12) 3s. 2d.  
 (13) £74 4s. 5¼d. (14) £49 15s.

XXXVI.—(1) 12s. 6d.; £9 14s. (2) £15 5s. 9¾d.;  
 £18 7s. 9d. (3) 8s. 1½d. (4) £2 3s. (5) £103.  
 (6) 17s. 9½d. (7) £42 6s. 10d.; £11 12s. 11d.;  
 £27 15s. 7½d. (8) £127 17s. 4½d.; £128 11s. 4d.;  
 £153 8s. 10d. (9) £1109 17s. 4½d.; £15 15s. 4d.;  
 £196 18s. 4d. (10) £26 14s.; £7 16s. 4d. (11)  
 £155 16s. 3d.; £14 10s. 7½d. (12) £105 8s. 4d.  
 (13) £31 8s. 10d.; £17 15s. 9d. (14) £474  
 7s. 6d.; £9 2s. (15) £139 13s. (16) £315 4s. 6d.  
 (17) £545 17s. 6d. (18) £5 11s. 8d. (19) £1  
 12s. 6d. (20) £78 17s. 3d. (21) £2232 10s. 10d.  
 (22) £4190 5s. 4d. (23) 2741 5s. 3¾d. (24) £655  
 12s. (25) £9.

XXXVII.—(1) £45 14s. 4d. (2) £454 19s. 11½d.  
 (3) £1040 18s. 0¾d. (4) £31 5s. 9d. (5) £50  
 10s. 6d. (6) £100 7s. (7) £1327 10s. (8) £1507  
 5s. 2d. (9) £544 16s. 6d.; £292 16s. 4½d. (10)

£9041 5s. 4½d.; £3999 13s. 10½d. (11) £8235 5s.; £19,153 9s. 3¾d. (12) £67 9s. 8¾d.; £98,718 15s. 10½d. (13) £3681 4s. 6¼d.; £307 16s. 5½d. (14) £5681 8s. 8¼d.; £28,388 6s. 6d. (15) £21,181 os. 2d.; £138,595 17s. 1½d. (16) £64 18s. 3½d. (17) £365 10s. (18) £651 12s. 6d. (19) £63 15s. (20) £180 os. 6d.

XXXVIII.—(1) £1 17s. 1¾d. (2) £3 1s. 9½d. (3) £3 17s. 9¼d. (4) £7 17s. 8d. (5) 10s. 0½d. (6) £ 210s. 2d. (7) £13 7s. 9¾d. (8) £15 12s. (9) £11 7s. 8d. (10) £6 19s.

XXXIX.—(1) 35,380 shillings 4430 pence. (2) 55,410. (3) 252. (4) 3819. (5) 3s. 6½d. (6) 40. (7) 55. (8) 510. (9) 400. (10) 252. (11) 12,302; 23,412. (12) 3184. (13) 56,268. (14) 10,440. (15) 2,750,100. (16) 8568. (17) 123,095. (18) 12,480. (19) 9200. (20) 735,000.

XL.—(1) 7s. 6d. (2) £5 4s. (3) £8 15s. (4) £41 15s. (5) £1 16s. (6) 17s. 6d. (7) 17s. 9¾d.; £3 7s. 2¼d.-1. (8) £12 7s. 8d.; £2 5s. 8¼d.-9. (9) £1 17s. 3d.; £3 9s. 4¼d.-5. (10) £3 10s. 7¾d.-7; £1 12s. 2¼d.-8. (11) £7 11s. 0½d.-2; £23 1s. 3d. (12) £34 12s. 7d.; £36 8s. 3½d.-2. (13) £12 1s. 3¾d. (14) £115 12s. 9d. (15) £625; £416 13s. 4d.; £208 6s. 8d. (16) £61 12s. 6d. (17) £38 9s. 7d. (18) £15 os. 4d. (19) £465 9s. 4¾d.-3. (20) £52 1s. 8d. (21) £1015 10s. 10d. A; £812 8s. 8d. B. (22) The first has £3980 10s.; the second, £3184 8s.; the third, £1592 4s.

XLI.—(1) £23 1s. 6¼d.-11. (2) £45 4s. 4½d. £40 3s. 10½d.-12. (3) £44 19s. 8½d.-6. (4) £4 3s. 4d. (5) Each child £555 11s. 1¼d.; each nephew £416 13s. 4d. (6) £58 16s. 4½d. (7) £52 1s. 8d.; £23 12s. 11¾d.-3. (8) £9 5s. 5¾d.-7; £96 os. 5¾d.-17. (9) £9 9s. 4½d.-6; £160 14s. 3¾d.-36. (10) £196 7s. 5¼d.-4; £28 5s. 10½d.-6. (11) £122 3s. 0¼d.-6; £107 15s. 7d.-28. (12) £49 os. 6d.-16; £34 4s. 11d.-52. (13) £83 19s. 4d. (14) £16 18s.

9 $\frac{3}{4}$ d.-36. (15) 12s. 1 $\frac{3}{4}$ d. (16) £10 1s. 9 $\frac{1}{4}$ d.-3. (17) £24 1s. 3 $\frac{1}{4}$ d.-7. (18) £84 12s. 8 $\frac{1}{2}$ d. (19) 64,294. (20) The one receives £468 15s.; and the other £531 5s.

XLII.—(1) 1320. (2) £1 15s. 0 $\frac{3}{4}$ d. (3) £95 3s. 4d. (4) 768. (5) £2 15s. 2 $\frac{1}{2}$ d. (6)*a* £19 2s. 7d. £48 1s. 11d., £17 9s. 8d.; *b* £457 14s. 4d., £204 2s. 6d., £13 6s. 7d. (7) 1280. (8) 522. (9) 418s. 3s. (10) 691-12. (11) 4780. (12) 477. (13) 150. (14) 514 sixpences and 3 $\frac{1}{2}$ d.; 102 h.-c. 2s. 5 $\frac{1}{2}$ d. (15) 4800. (16) £607 12s. 8 $\frac{3}{4}$ d.; £434 os. 7 $\frac{1}{4}$ d.

XLIII.—(1) 6s. 7 $\frac{1}{2}$ d. (2) £1 5s. 3d. (3) £13 15s. 3d. (4) £2 17s. 4d. (5) £5 13s. 1d. (6) £117 9s. (7) £26 os. 10d. (8) 1710 persons. (9) 27,480. (10) £14 9s. 2 $\frac{3}{4}$ d. (11) 9491. (12) £12 8s. 4d. (13) £7 1s. (14) 153 of each, or 459 persons in all.

XLIV.—(1) 15 lbs. 4 oz. (2) 1 lb. 14 oz. (3) 15s. (4) 2 tons 16 cwt. 19 lbs. (5) 1 qr. 5 oz. (6) 411 lbs. 6576 ozs. (7) 1520. (8) 62 $\frac{1}{2}$  lbs. (9) 108 lbs. (10) 95-52. (11) £4 12s. 1d. (12) 8 cwt. 1 qr. 13 lbs. 8 oz. (13) £16 5s. 6d. (14) 448. (15) 6 tons 1 cwt. 2 qrs. 13 lbs. 11 ozs.; 4 tons 11 cwt. 1 qr. 26 lbs. 7 ozs. (16) 8 tons 3 cwt. 1 qr. 19 lbs. 3 oz. (17) 4 cwt. 1 qr. 25 lbs. 2 oz. (18) 4 tons 15 cwt. 3 qrs. 5 lbs. (19) 5 tons 11 cwt. 1 qr. 26 lbs.; 56 tons 19 cwt. 1 qr. 15 lbs. (20) 2 tons 11 lbs. (21) 883-5. (22) 2240. (23) 1 $\frac{1}{2}$ d. (24) 261-1. (25) 23 lbs. 12 ozs. (26) £38 16s. 4d. (27) 6 cwt. 21 bs. 12 oz. (28) 197,120 ozs. 3,153,920 drs. (29) 5,4656.

XLV.—(1) 132. (2) 4620 ft. 55,440 ins. (3) 18 miles 7 furs. 113 yds. 1 foot. (4) 63 yds. 11 ins. (5) 26 yds. 9 ins. (6) 1896. (7) £1 6s. 3d. (8) 4 miles 2 furs. 100 yds. (9) £568 10s. (10). 1135-8. (11) 5 furs. 140 yds. (12). 2640. (13) 1188. (14) £313 10s. (15) 7200.

XLVI.—(1) 324. (2) Ceiling 245 sq. yds. 5 ft.; 2 long walls 115 sq. yds. 5 ft. each; 2 short walls 60 sq. yds. 4 ft. each. (3) 105. (4) £5 5s. (5) 450. (6) 84 sq. yds. (7) £197 8s. 9d. (8) 18,144. (9) £336. (10) £8 16s. 1 $\frac{1}{4}$ d. (11) 486. (12) 7920; £594.

XLVII.—(1) 20 a. 1 r. 22 p. (2) 1 a. 3 r. 15 p. (3) £2240. (4) 600. (5) 160 a. (6) £236 5s. (7) £53 1s. 3d.

XLVIII.—(1) 4158. (2) 41,960. (3) 5400. (4) £8 13s. 3d.

XLIX.—(1) 15 gal. 29 qt. 1 pt. (2) 8704. (3) 98—2. (4) 10 gal. 1 qt. (5) 88 gal. 1 pt. (6) 1504. (7) 625 gal. (8) 2 grs. 4 bus. 2 pks.

L.—(1) 8760. (2) 2976. (3) 9,936,000. (4) £26 15s. 6d. (5) 3406. (6) £35 15s. od. (7) 300,960. (8) 10,950.

LI.—(1) £6 16s. 6d. (2) 2346. (3) £47 18s. 6d. (4) £9 8s. 4d. (5) £3 13s. 1½d. (6) £276 2s. 10½d. (7) 284. (8) 248. (9) 676. (10) £83 2s. 8½d. (11) 6080 yds.; £1596. (12) 1800 cub. ft.; 3,110,406 c. in (13) 3520. (14) 448; 1792; 35,840.

LII.—(1) 10; 9. (2) 4; 8. (3) 2; 5. (4) 2. (5) 4. (6) 20; 10; 6; 15. (7) 12; 12. (8) 5d.; 15s. (9) 2½d. (10) 9; 4; 15. (11) 15. (12) 21. (13) 20. (14) ¼; ⅒; ⅝. (15) ⅔. (16) 2 feet; 6 furs.; 7 ins. (17) 6s. 3d.; 11s. 8d.; 8s. 4d. (19) 4; 8; 10. (20) 6 furs.; 1232 yds.; 550 yds. (21) 14 lb.; 8 cwt., 2 qrs. (22) 2 ft. 6 ins.

LIII.—(1) ⅔. (2) ⅛. (3) ⅙. (4) ⅒ or ⅓. (5) 8s. 4d. (6) ⅞ lb. or 14 oz. (7) 8. (8) 7 ins. (9) 35 minutes. (10) 3 qts., 1½ gills. (11) ⅙. (12) 1s. 8d.; £1 8s.

LIV.—(1) 621. (2) 66,674. (3) 9570; 14,432; 2854½. (4) 816¾; 3751; 13,824¼. (5) 997½. (6) 9180. (7) 143,656⅔. (8) 8858¾; 299,559¼.

LV.—(1) 1953⅓. (2) 5940; 960 p., 5 yds. (3) 19,200. (4) 714 and 4 ins. remain. (5) 174; 25¼ yds. remain. (6) 4858—<sup>21</sup>; 465—<sup>11</sup>. (7) 2725—<sup>92</sup>; 3614—2. (8) 177—3; 2826—1215. (9) 1890. (10) £3 13s. 8d. (11) 688. (12) 71,550,304. (13) £2 9s. 8¼d. (14) £982,580 5s. 7¼d. (15) 7560. (16) 2478—6. (17) £2 1s. 11½d. (18) £250 5s. (19) ¼. (20) 378. (21) 11,712.

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